SENSITIVE PLANT SURVEY IN THE SIOUX DISTRICT

CUSTER NATIONAL FOREST

1994

Carter County, Montana

and Harding County, South Dakota

Prepared by:

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May, 1995

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EXECUTIVE SUMMARY

Sensitive plant surveys were conducted in the scattered units making up the Sioux Ranger District of Custer National Forest, resulting in the discovery and documentation of 26 new populations of 8 Montana plant species of special concern and 11 new populations of 5 South Dakota plant species of special concern. This report compiles site-specific and status information on these thirteen species, and background information on the 5 species which were not relocated. Of the 18 species:

- One species currently has U.S. Forest Service Region 1 sensitive status; now known from the Sioux District
- Four are recommended for consideration as sensitive
- Five are recommended for consideration as watch for purpose of further assessment by Custer National Forest
- Three are recommended to be dropped from further consideration by the U.S. Forest Service, and
- Three others are recommended to be dropped from further consideration by both the U.S. Forest Service and the respective states

The opportunity to conduct a study near the intersection of three state boundaries signifies an unique opportunity to integrate disparate study area information and state species lists to provide a more cohesive picture of key regional botanical resources. The isolated escarpments making up the Sioux District units represent significant biogeographic features on the high plains. Their location presents a challenge to the Regional U.S. Forest Service in setting meaningful standards for sensitive species designation.

ACKNOWLEDGEMENTS

We thank Clint McCarthy, Custer National Forest, and David Ode, South Dakota Natural Heritage Program, for their help throughout the study. Additional support was provided by Jim Farrell, Sioux Ranger District of Custer National Forest. The cooperation of the South Dakota Natural Heritage Program is gratefully acknowledged. Close-up photographs of <u>Haplopappus armerioides</u> and <u>Penstemon nitidus</u> in flower were taken by David Ode. We are also indebted to herbarium personnel for information and use of herbarium resources, including John Rumely, David Dyer, Ronald Hartman, and Gary Larson. We thank Carrie, Bruce and Ben Jacobson for hand delivery of the South Dakota field maps. Finally, GIS map production by Cedron Jones, data management by Margaret Beer, Kathy Jurist, and Debbie Dover, and editing by Kathy Jurist are gratefully acknowledged. Financial support for the project came from the Custer National Forest and the Montana Natural Heritage Program.

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Appendix E (SD)	Close-up and habitat photographs (South Dakota)

The following appendices are being submitted separate from the report:

Appendix F (MT)	Preliminary vascular flora of Carter County, Montana
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INTRODUCTION

A sensitive plant species survey was conducted on the Sioux District of Custer National Forest in Carter County, Montana, and Harding County, South Dakota. The primary purpose of this study was to locate and evaluate populations of vascular plant species designated as sensitive by Region 1 of the U.S. Forest Service (USDA 1994) or potentially warranting consideration as sensitive based on information compiled by the respective Natural Heritage Program in Montana and South Dakota (Heidel 1994, Ode 1992). The work also represents a preliminary survey of floristic diversity across the District. Botanical work was conducted concurrently with a sensitive animal species study conducted by the Montana Natural Heritage Program (Hendricks and Reichel 1995a,b; Reichel 1995).

Surveys to determine the status of rare plant species are being conducted throughout the west in response to the Endangered Species Act of 1973 and to the conservation initiatives of the U.S. Forest Service (USDA Forest Service 1994, Reel et al. 1989) and other agencies. Survey results serve to identify conservation priorities, contribute to conservation strategies, and provide a baseline for sensitive species programs, project reviews and resource management plans at an early stage of development on the Custer National Forest.

STUDY AREA

The Sioux District of Custer National Forest spans two counties: Carter County at the extreme southeastern corner of Montana, and Harding County at the extreme northwestern corner of South Dakota (Figure 1). It is made up of eight separate units spanning a distance of app. 100 miles (161 km) east-to-west. These units were the original lands that made up the Sioux National Forest. The nearest towns are Buffalo and Camp Crook in South Dakota, and Ekalaka in Montana. The Sioux District headquarters of the Custer National Forest is located in Camp Crook.

The six largest Sioux District units provided the focus of this study:

Montana Units	South Dakota Units
Chalk Butte	North Cave Hills
Ekalaka Hills	South Cave Hills
Long Pines	Slim Butte

Fieldwork did not include the West Short Pines, and was limited in coverage of the East Short Pines; these two smallest South Dakota units are therefore treated only briefly in this report.

Each of the units that make up the District is a discrete, prominent escarpment on the unglaciated high plains landscape, with distinct surface geology and vegetation. They include the highest points in the counties and contain a range of environmental and biological features in unique forms and combinations.

The study area escarpments are capped by relatively resistant Tertiary sedimentary deposits, including (from oldest to youngest): the Arikaree Formation of gray sandstone with layers of concretions; the Tongue River member of the Fort Union Formation with clay, shale, siltstone and sandstone; and the White River Group formations with light colored (calcareous) clay and local beds of sandstones (Ross et al. 1955). There are small outcrops of the older Hell Creek Formation that flank the southern units in Harding County (Slim Buttes, Short Pine Hills). Some of the most extensive calcareous outcrops of the White River Group in the three-state area are in the Sioux District of Custer National Forest, including the Slim Buttes, Chalk Butte, and restricted areas of the Long Pines, South Cave Hills, and lands mainly north of U.S. Forest Service boundaries in the East Short Pines. Each of the escarpments are erosional features that were more or less all part of a broad plain during the late Miocene time (Bluemle 1991). They were created during the late Pliocene time 3-5 million years ago during a major cycle of widespread erosion, and persist above surrounding Cretaceous tablelands.

Soils are mapped in detail for Harding County (Johnson 1988), and the Carter County soil survey is in progress. The upper levels of soil taxonomy have been mapped for Carter County in a preliminary manner by Montagne et al. (1982); under which the Sioux District Units are made up of primarily of Ustochrepts, Ustorthents, and Haploborolls (i.e., dry, northern prairie soils under varying degrees of soil development). Similarly, the Slim Buttes are primarily covered by the Reva-Rockoa association of well-drained, shallow to deep, moderately sloping to very steep calcareous soils of gravelly and loamy texture. The Cave Hills are primarily covered by the Cohagen-Rock outcrop association of well-drained, shallow, moderately sloping to very steep loamy and sandy loam texture. The Short Pine Hills are primarily covered by the Cohagen-Rock outcrop association of well-drained, shallow, moderately sloping to very steep loamy soils.

The study area has a continental semi-arid climate characterized by temperature extremes, ranging almost 150 degrees F annually, and frequently up to 40 degrees daily; accentuated by windy conditions (Visher 1914). In general, the study unit buttes are more exposed and with a wider range of microclimates compared to the surrounding plains. The growing season length and conditions are highly variable. Average annual precipitation is 14.7 inches (37.4 cm) in Harding Co.(Johnson 1988), but two out of ten years typically have severe drought conditions with less than 9 in (22.86 cm) during the growing season. About 75% of the annual precipitation falls during the growing season; average climate patterns in Camp Crook, South Dakota have peak monthy precipitation of almost 3 inches (7.6 cm) in May and peak average monthly temperatures over 70 degrees F in July (from Hansen and Hoffman 1987). The 1993 growing season had been a wet year. The 1994 growing season started as a typical year in Carter County and a dry year in Harding County. Net precipitation between January-June 1994 for Ekalaka was 8.66 inches (22 cm) and for Camp Crook was 4.43 inches (11.25 cm; The Ekalaka Eagle; Vol. 86, No. 27 of 8 July 1994). Rainfall during the summer is mainly from thunderstorms and localized cloudbursts, typically very light but sometimes accompanied by flash flooding. Storms may also be accompanied by heavy hail and lightning strikes; seven fires were ignited by lightening strikes in the Chalk Buttes in a single storm on 1 July 1994 (The Ekalaka Eagle), burning the northernmost end of the Chalk Butte unit and spot fires elsewhere. Lightening strikes occur each year on the District, with the majority being less than 1 acre in extent (USDA Forest Service 1976). Large areas of the Long Pines unit burned in the 1988 Brewer Fire.

The District lies at the divide of watersheds for tributaries draining into east-flowing rivers (Grand, Moreau and Powder) and a north-flowing river, the Little Missouri. The District has no perennial streams, but contains intermittent streams and numerous springs throughout the areas, particularly at the contact between the Ludlow member of the Fort Union Formation and overlying bedrock which is more porous or fractured. Groundwater is the primary water source for domestic and livestock use.

The state line does not correspond with any major break in surface features, but it does correspond with the boundaries of studies conducted in Montana and South Dakota. A detailed biological survey was made in Harding County shortly after the time of settlement (Visher 1914); however, comparable stdies in the adjoining Carter County were lacking. The study by Visher (1914) provides a basis for addressing species' distribution and status, as well as trend over the 80-year interval.

Eight ecosystems as characterized by topographic position, slope, rockiness and overall vegetation structure are described for management planning by the U.S. Forest Service (1976) in the study area. A list is presented in the table on the next page. Overall, the South Dakota units contain more extensive prairies and the Montana units contain more woodlands.

A preliminary vegetation classification of habitat types is presented in Hansen et al. (1988), a classification which spans three districts including Sioux District. Of the 27 forest, woodland and steppe types which were described, nearly all occur on the Sioux District with exception of types dominated by Festuca idahoenis or Sarcobatus vermiculatus. Vegetation on the District has not been mapped beyond the level of the ecological land units, whose main distinctions are between prairie, conifer woodland, hardwood stands, and sparsely-vegetated settings.

The vegetation of the District has otherwise been described in terms of areas with unique vegetation (USDA Forest Service 1976), exlosure studies, Research Natural Area establishment records, and other site-specific studies. Unique vegetation types that were identified include areas with peripheral species such as paper birch (not dominant but as local component of other plant associations), "relict" grasslands on isolated butte settings inaccessible to livestock, areas having some level of "high value botanical communities" as identified by Van Bruggen (USDA Forest Service 1975), and sites harboring "rare or endangered plants".

Mixed grass prairie is the matrix in which other vegetation types are included, depending on slope, aspect, topographic position, rockiness, parent material and localized hydrological factors. Mixed grass prairie is prevalent on exposed escarpment slopes, on the level butte tops and on the plains surrounding escarpments. It is dominated by a mixture of mid and short grasses. These include habitat or community types dominated or with major components of Stipa comata, Carex filifolia, Carex heliophila, Bouteloua gracilis, Koeleria macrantha, Poa sandbergii and Agropyron smithii. Rosa arkansana is a frequent shrub, with Gutierrezia sarothrae and Artemisia spp. in some places. A. cana is prevalent along lower valley stream terraces. Forbs are normally scattered individuals, typically Artemisia ludoviciana, Ratibida columnifera, Phlox hoodii, Polygala alba, and Erigeron pumilus.

The steep, south-facing slopes are covered by little bluestem prairie dominated by warm-season grasses. The soil is usually sandier, more gravelly, and often rocky. The vegetation is dominated by Andropogon scoparius, Calamovilfa longifolia and Agropyron spicatum, with varying amounts of Muhlenbergia cuspidata and Bouteloua curtipendula. Anemone patens is a typical forb. Under Agropyron spicatum dominance, the grass cover decreases, consisting primarily of clumps separated by open areas, where forbs become more frequent. The latter include Echinacea angustifolia, Helianthus rigidus, Dalea spp., Solidago missouriensis, and on the more open, gravelly slopes Phacelia hastata, Lesquerella alpina, Ipomopsis congesta, and Senecio canus. The shrub Rhus trilobata is locally dominant, and patches of Prunus virginiana and Amelanchier alnifolia are common. In many places little bluestem prairie grades into a Pinus ponderosa forest above it.

The greatest proportion of the Long Pines and Ekalaka Hills are covered with Pinus ponderosa woodland and forest. These vary from scattered trees on south-facing slopes, with an understory of species usually found in little bluestem prairie, to denser forests on more level terrain on mesa summits, with very little understory, and a thick litter layer. On some ridge tops Thermopsis rhombifolia is the dominant forb.

Table 1. ECOSYSTEM TYPES IN THE SIOUX DISTRICT STUDY AREA UNITS

ECOSYSTEM UNIT[1]	CHALK BUTTE	EKALAKA HILLS	LONG PINES	NORTH CAVE HILLS	SOUTH CAVE HILLS	SLIM BUTTES	EAST SHORT PINES	WEST SHORT PINES
HARDWOOD DRAW	+	+	+	+	+	+	+	+?
PONDEROSA BENCH /PONDEROSA SLOPE	+	*	*	+	+	+	+	+
UPLAND GRASSLAND (escarpment slopes)	*	+	+	+	+	*	+	+
ROLLING GRASSLAND (low plains)		+	+			+		
ROCKLAND				+	+			
TABLE TOP GRASSLAND	+	+	+	*	*	+	*	*?
RIMROCK	+	+	+	+	+	+	+	+
RIMROCK BREAKS (badlands)						+	+	+

---

[1] The presence of these ecosystem types in the various study units is indicated by a "+", based on U.S. Forest Service (1976) and field observations. The prevailing ecosystem type is indicated by a bold-faced asterisk (*), based on field observations.

The 1988 Brewer Fire in the Long Pines destroyed large areas of pine forest. The mesa surface now consists of *Poa pratensis* and *Symphoricarpos occidentalis* within a matrix of standing dead trees. Some steep slopes subjected to intense fire now contain little vegetation except for clumps of *Dichanthelium wilcoxianum* and a few forbs, or *Lupinus argenteus* with other grasses. Downed timber is often abundant enough to be an impediment to travel (most of the local residents carry a chainsaw when using Forest Service roads and trails).

In more mesic settings, other woody vegetation dominates. Shrubs like *Shepherdia argentea* sometimes forms valleybottom thickets. The prostrate *Juniperus horizontalis* sometimes forms large hillside patches. In some places *Populus tremuloides* forms groves of small trees, and other shrubs such as *Prunus virginiana*, *Amelanchier alnifolia*, *Ribes* spp., and *Rosa woodsii* dominate locally. The most widespread hardwood dominant is *Fraxinus pensylvanica*, which occurs along small drainages and other localized sheltered settings. Woody draw ground cover is relatively high, and typically includes *Toxicodendron rydbergii*, *Mahonia repens*, *Rubus idaeus*, *Galium boreale*, *Carex backii*, *C. brevior*, and *C. sprengellii*. Many of the stands provide sheltering shade from summer heat, and have abundant *Poa pratensis* under intense grazing.

The most mesic woodland sites are found on north- and east-facing slopes. They have a rich woodland understory, especially those sites located in sheltered, cove-like areas within drainages. *Mahonia repens* is often abundant, along with *Bromus ciliatus*, *Carex foenea*, *C. rossii*, and *C. sprengelli*. Other species include *Arnica cordifolia*, *Oryzopsis micrantha*, *Fragaria virginiana*, *Heuchera richardsonii*, *Toxicondendron rydbergii*, *Juniperus communis*, and *Smilacina stellata*. A few stands of *Populus tremuloides* occupy small areas within the pine forests, and occasional *Betula papyrifera* are present.

Springs are present in the study area, representing almost the only stable, season-long water flow in both counties. Most are active, some feed small streams for a short distance, and a few contain remnants of old beaver dams and stagnant pools. The water is bordered by narrow zones of vegetation which grade from emergents in shallow water, to wet meadow, to dry meadow furthest from the water. Emergents include *Alisma triviale*, *Eleocharis palustris*, *Scirpus* spp., and *Typha* spp. In some situations *Ranunculus aquatilis*, a submergent, is present. A wet meadow is typically found at the edge of the water containing *Carex* spp., *Juncus balticus*, *Beckmannia syzigachne*, *Glyceria striata*, *Veronica* spp., *Cicuta douglasii*, *Mentha arvensis* and sometimes *Bidens cernua*. A dry meadow occurs furthest from the water, with the least soil moisture. Some of the same species are present, along with *Agropyron smithii*, *Solidago canadensis*, *Erigeron glabellus*, *E. philadelphicus*, *Viola* spp., *Thalictrum dasycarpum*, and *Urtica dioica*. There are also species that are usually found on the surrounding slopes, such as *Clematis ligusticifolia*, *Parietaria pennsylvanica*, and *Ribes* spp. This is an aggregate summary; no single spring or stream necessarily contains all the species listed. Also, many springs have been heavily trampled by cattle, and the meadows, especially dry meadow, have been intensively grazed so that *Poa pratensis* has replaced much of the native vegetation. A grazed alkali meadow is present along a drainage in North Cave Hills, dominated by *Juncus balticus*, *Agrostis stolonifera*, and *Triglochin concinnum*. A few springs, e.g. Picnic Spring, have well developed wet and dry meadows, but most are heavily grazed.

By contrast, some arid slopes in the Long Pines and south fringes of the Slim Buttes contain badlands communities on barren, clay and shale ridges and slumps. These sparsely-vegetated settings are constantly eroding and do not have well-developed plant associations, but *Chrysothamnus nauseosus*, *Artemisia tridentata*, and *Atriplex nuttallii* are frequent shrubs. Sparse grass cover is contributed by *Agropyron dasystachyum*, *Distichlis stricta*, and occasionally *Hordeum jubatum*. Forbs include *Eriogonum pauciflorum*, *Oenothera caespitosa*, *Grindelia squarrosa*, and *Atriplex dioica*. This is an infrequent community in the study area that is more widespread outside of National Forest boundaries.

In a few areas, outcrops of soft sandstone are present on ridge slopes and as abrupt tableland rims, with loose sand slopes below that contain sparse amounts of *Rumex venosus*, *Lupinus pusillus*, *Oryzopsis hymenoides*, *Yucca glauca*, and *Tradescantia occidentalis*. Portions of the summit of North Cave Hills contain rocky, gravelly slopes and claypan balds with *Chrysothamnus nauseosus*, *Hymenoxys acaulis*, *Erigeron compositus*, and *Haplopappus armerioides*. Limestone outcrops have distinct communities that include calciphilic forbs like *Astragalus vexilliflexus*, *Senecio canus* and *Hymenoxys acaulis*.

METHODS

Prior to fieldwork, preliminary lists of target plant species were compiled to guide timing and selection of habitats to be searched (Appendix A (MT), Appendix A (SD). The Biological Conservation Database (BCD) was queried in the respective state heritage programs to produce copies of existing records that included all known sensitive plant species (USDA Forest Service 1994) and Montana or South Dakota plant species of special concern (Ode 1992, Heidel 1994) on the District or from the surrounding counties that may or may not have potential habitat on the District. Two Montana species of special concern were known from the District (*Carex torreyi*, *Sphenopholis major* var. *obtusata*) neither having sensitive species status. Eight South Dakota species of special concern were known on or adjoining the District (*Aster pauciflorus*, *Chaenactis douglasii*, *Chenopodium subglabrum*, *Festuca idahoensis*, *Gentiana affinis*, *Haplopappus armerioides*, *Mertensia ciliata*, *Penstemon nitidus*), none having sensitive species status.

Custer National Forest lands in the Sioux District were surveyed for sensitive plants in the summer of 1994 by Bonnie Heidel (July 2-11) and by Keith Dueholm (June 1-July 2, August 23-28). Appendix B shows the primary search routes on maps spanning the study area. Fieldwork by Heidel was concentrated in the north end of the Chalk Buttes and in the South Dakota units. Fieldwork by Dueholm was concentrated in the south end of the Chalk Buttes and remaining Montana units. The fieldwork and accompanying herbarium work is not a comprehensive evaluation but a compilation and sensitive species baseline for reference to be used in subsequent biological assessments and resource planning.

A wide range of study area habitats and geography was evaluated. Target species were searched for in appropriate habitats focusing at phenologically appropriate times for identification. Existing records were sought to expand the site information, except for occurrences that had been previously documented by the South Dakota Natural Heritage Program. Both uncommon habitats and outstanding examples of typical habitat were included in the survey.

When plant species of special concern were encountered, standard field forms were filled out (Appendix C) and the locations were marked on U.S.G.S. topographic maps (7.5' quads). For each population, data was collected on habitat (associated vegetation, landscape position, geology, soils), demography and species biology (population numbers, extent, phenology, vigor, reproductive success), and potential threats to the populations. Photographs (35 mm slides) were taken of the plants and their habitats, and voucher specimens collected as appropriate (Montana Native Plant Society no date). All specimens will be deposited at major herbaria, including those at the University of Montana (MONTU), Montana State University (MONT), the University of South Dakota (SDU) and South Dakota State University (SDC).

All vascular plants encountered were identified in order to consider prospective sensitive species not included in the original target list, and to compile a preliminary flora for the District. Primary references used to key out plants in the field were Van Bruggen (1985), Dorn (1977, 1984, 1992), Larson (1993) and Great Plains Flora Association (1986).

There is high dissimilarity between the Montana and South Dakota target lists of state species of special concern because of low endemism levels in the northern Great Plains, with many of the taxa being peripherals at their eastern or western range limits and barely crossing the respective state lines. Field notes were taken throughout the study area on all species that are considered as species of special concern in either Montana, South Dakota, or North Dakota to provide information that might help determine habitat requirements and status across state lines.

Field survey forms were transcribed for BCD data entry in the respective Natural Heritage Program offices. These entries have been made into printouts (Appendix C). All Montana records have also been incorporated into a database accessible on the Data General system of the U.S. Forest Service.

RESULTS

The total number of state species of special concern known from the Sioux District doubled as a result of this study, and the total number of known populations multiplied. Eight species (26 populations) were documented in Montana, and five species (11 populations) were documented in South Dakota representing a total of thirty-seven new populations of thirteen plant state species of special concern. Two target species were not found, and may be extirpated from the original collection sites. Incidental information was compiled on three other species from the District which were not found. All 18 target species known on the District are depicted in Figure 2, and presented along with resulting rank recommendations in Table 2 for Montana and in Table 3 for South Dakota. Included among the former are two native species not previously known in the Montana flora, which are automatically added to the Montana state list of species of concern.

Over 300 species of vascular plants were identified in both the Montana and South Dakota study area units (Appendix F. Preliminary vascular flora), in addition to the taxa recorded in Booth and Wright (1966) and Visher (1914). Included among these are many target species which were found outside of the state in which they are being tracked but which nonetheless provide search and status information (Appendix G). The paucity of botanical investigations is believed to account for the apparent rarity of many species at the three-state intersection of Montana, South Dakota and North Dakota.

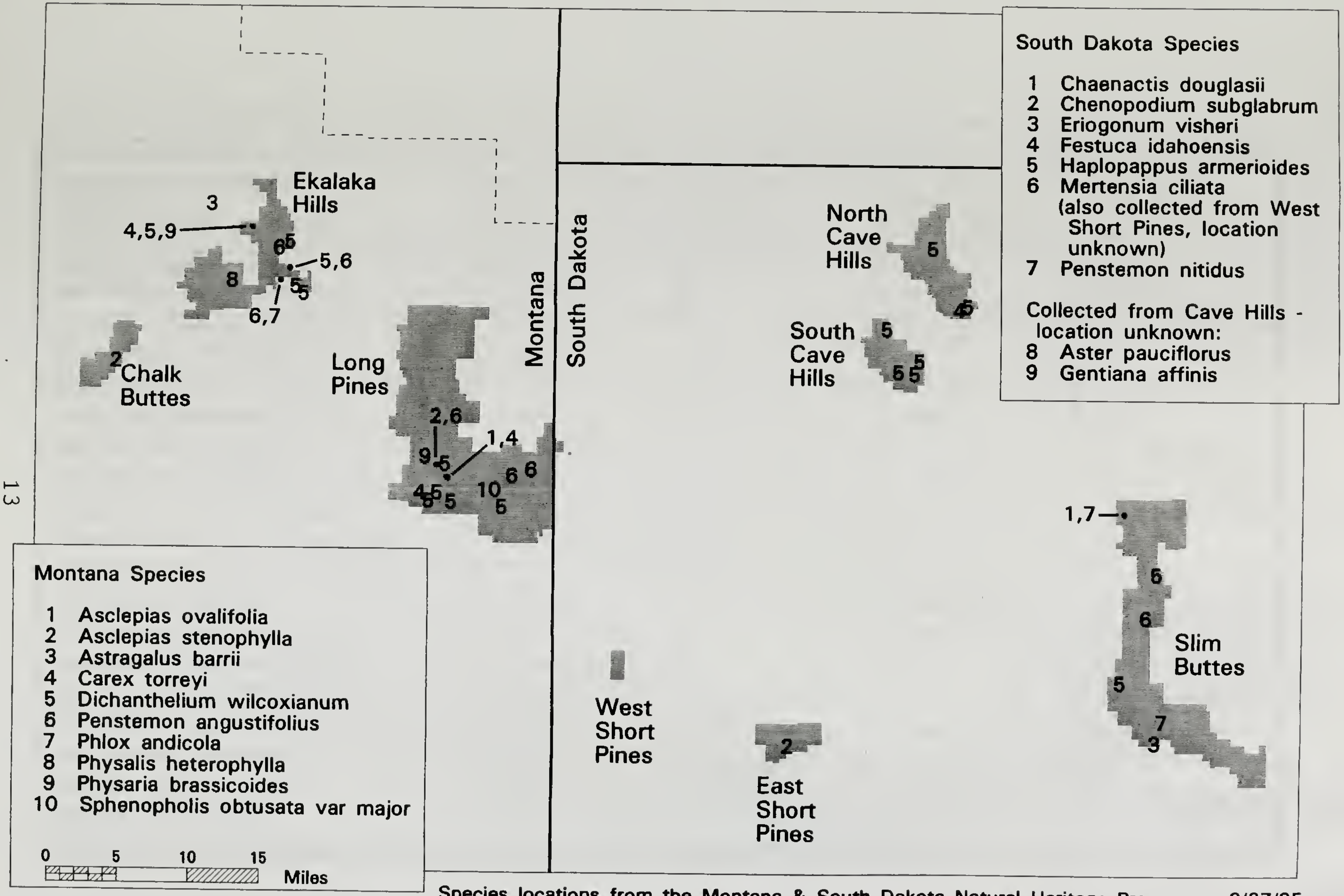
The remainder of this section is devoted to status information compiled on each of the 18 target species. Descriptions of the taxa are given to augment floras (Dorn 1984, Van Bruggen 1985, Great Plains Flora Association 1986). Information content includes:

A. Description
B. Present status
C. Geographic distribution
D. Habitat
E. Population biology and biological interactions
F. Overall assessment and management recommendations

Study area information is emphasized in these abbreviated status reports. A map of each species' Great Plains distribution is reproduced from the Great Plains Flora Association (1977).

Illustrations of each species are included with the text as available, and color xeroxes from slides are presented in Appendix E, including photographs of the plant close-up and its habitat. Species description text includes strictly metric units for the technical description, but both metric and English for general description and diagnostic characters.

Plant Species of Special Concern, Sioux District, Custer National Forest



Species locations from the Montana & South Dakota Natural Heritage Programs, 2/27/95

Table 2. Populations of target plant species documented in the Sioux District - Montana.

Scientific name Common name	Current MTNHP global, state rank	Current USFS Region 1 status	Recommended USFS Region 1 status	No. of pop. on District
Asclepias ovalifolia Ovalleaf milkweed	G3G5 S1	-	sensitive	1
Asclepias stenophylla Narrow-leaved milkweed	G4G5 S1	-	-	2
Carex torreyi Torrey's sedge	G4 S1	-	watch	3
Dichanthelium wilcoxianum Wilcox's panic grass	G5 S1	-	-	10
Penstemon angustifolius Narrowleaf penstemon	G5 S1	-	-	6
Phlox andicola Moss phlox	G4 S1	-	watch	1
Physalis heterophylla Clammy ground cherry	G5 SU	-	-	1
Physaria brassicoides Mustard twinpod	G5 S1	-	watch	2
Sphenopholis obtusata var. major Slender wedgegrass	G5T5 S1	-	sensitive	Unable to relocate historic record

Table 3. Populations of target plant species documented in the Sioux District - South Dakota.

Scientific name Common name	Current SDNHP global, state rank	Current USFS Region 1 status	Recommended USFS Region 1 status	No. of pop. on District
Aster pauciflorus Marsh alkali aster	G5 SU	-	watch	Unable to relocate hist. record
Chaenactis douglasii Douglas' dusty maiden	G5 SU	-	-	1 (+ hist. record)
Chenopodium subglabrum Smooth goosefoot	G2G4 SU	sensitive	watch	1?
Eriogonum visheri Dakota buckwheat	G3 S3	sensitive	sensitive	1
Festuca idahoensis Idaho fescue	G5 SU	-	-	1?
Gentiana affinis Northern gentian	G5 S2	-	sensitive	Unable to relocate hist. record
Haplopappus armerioides Skyline goldenweed	G4 SU	-	-	10 (+ hist. records)
Mertensia ciliata Mountain bluebells	G5 S1	-	sensitive	1 (2?)
Penstemon nitidus Shining penstemon	G5 SU	-	-	2

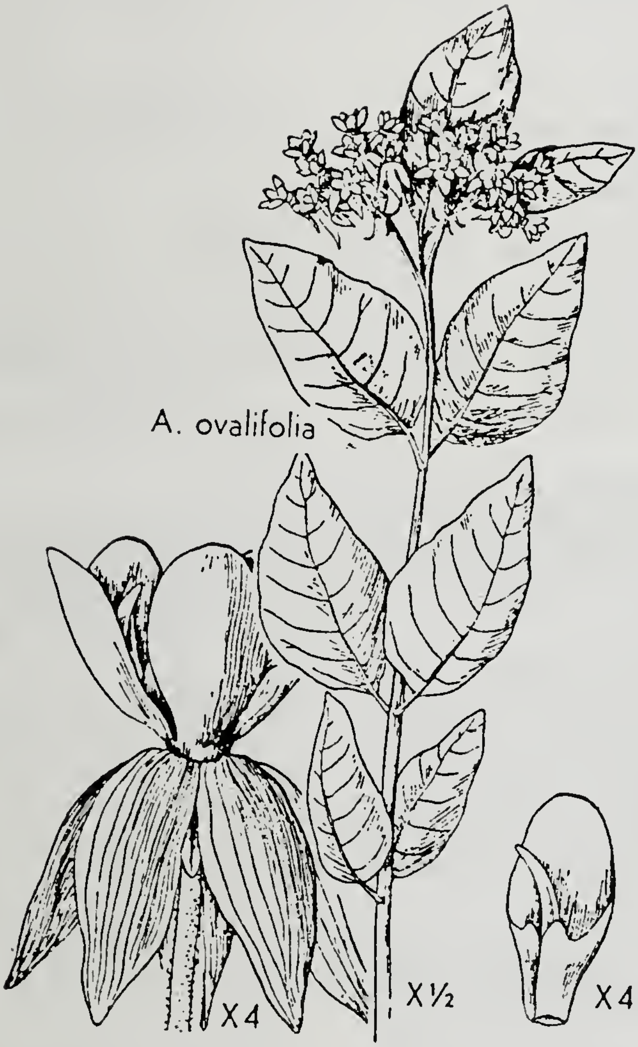
Asclepias ovalifolia Dcne.
Asclepiadaceae
Ovalleaf milkweed

A. Description

1. General description: Herbaceous perennial, stems mostly single or paired; simple or branched, upright and 2-6 dm (7.9-23.6 in) tall. Leaves mostly opposite; blades lanceolate to broadly ovate. Flowers creamy white, stamens evolved into a column to which are attached sac-like "hoods", each hood with an incurved "horn" appendage. Approached peak flowering on 2 July 1994, with a few plant in very early stages of fruit formation.

2. Technical description: Perennial herb from a shallow, slender rhizhome. Upright stems mostly solitary or paired from a simple to branched and somewhat thickened base, simple, slender (1)2-6 cm tall, sparsely to densely villous. Leaves mostly opposite or subopposite, blade lanceolate to broadly ovate, erect to spreading, (2)4-8 cm long, (1)1.8-4.5 cm wide, firmly membranaceous, sparsely to moderately villous, especially beneath, apex broadly acute to rounded, occasionally mucronate, margins flat to slightly revolute, base obtuse to rounded; petiole 0.1-1 cm long. Infloresences 1-3, terminal or subterminal,(4)8-20 flowered; peduncles 0.5-3 cm long or infloresence sometimes sessile; pedicels filiform, 15-20 mm long, puberulent. Flowers 8-10 mm tall; calyx lobes green to purple, lanceolate to ovate, 2.3-3.5 mm long, villous. Corolla lobes greenish-white, often purple-tinged dorsally, elliptic-lanceolate, reflexed, 5-6 mm long, sparsely to moderately puberulent dorsally; gynostegium greenish-white to cream or yellow, briefly stipitate, glabrous; column obconic, 0.4-0.6 mm tall, 1.2-1.8 mm wide. Hoods elliptic-oblong, attached near base, spreading, 3.8-5 mm long, not fleshy, freely open above, the apex rounded, plane, ca 2 mm higher than the anther head, the margins with a pair of triangular lobes below the midpoint, the base not saccate. Horns falciform, adnate to lower 1/3 of hood, arching over the anther head, 0.7-0.8 X longer than the hood; fleshy pads obscure, narrowly bilobed. Anther truncate-conic, 1.6-2.5 mm tall, 2.2-3 mm wide; anther appendages ca 1.1 mm long; anther wings abruptly rounded at base, not notched, scarcely spurred, ca 1.8 mm long. Follicles fusiform, erect on deflexed pedicels, 6-8 cm long, 0.8-1.3 cm thick, without tubercles, densely puberulent; seeds ovate, 5.5-7 mm long; coma tan, 1.8-35 cm long (from Great Plains Flora Association 1986).

Figure 4.
ASCLEPIAS OVALIFOLIA
From Gleason 1952



3. Diagnostic characterisitcs: The most distinguishing characters of *Asclepias ovalifolia* are the oval, light green, softly pubescent leaf blades, and medium-size flowers with greenish white rounded corollas 5-6 mm (.19-.23 in) long. The leaves of *A. speciosa* are larger and the flowers are more purplish in color, as well as much larger. The flower of *A. viridiflora* and *A. stenophylla* have hoods without horns.

B. Present legal or other formal status

1. Federal

A. U.S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: none

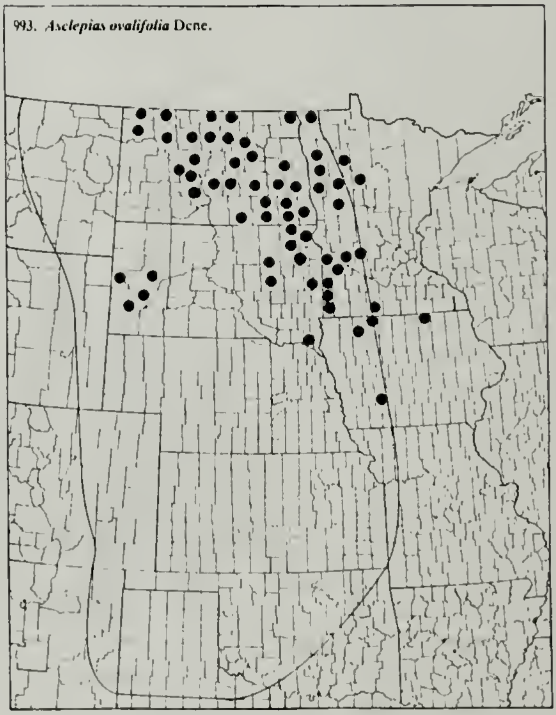
2. State: It has been assigned a state rank of "S1" (critically imperiled) since it is only known from one site.

C. Geographical distribution

1. Species range: Northern plains and Midwest, from Alberta to Manitoba; south to Wisconsin, Illinois, Iowa and Wyoming.

2. Montana distribution: In Montana, it is known only from one site in Carter County, representing a newly-discovered addition to the flora of Montana and a minor western range extension for the species as a peripheral.

3. Occurrence in the study area: The Sioux District site is in the southwestern end of the Long Pines. It is not known from the South Dakota units of the District.


993. *Asclepias ovalifolia* Dcne.

D. Habitat

1. Associated vegetation: The *Asclepias ovalifolia* occurs at the edge of a clearing in scattered *Pinus ponderosa*. The clearing has expanded slightly after a burn which killed trees in the species' vicinity. The area is moderately grazed, and dominated by *Poa pratensis*, *Symphoricarpos occidentalis*, and

Mahonia repens. Native grasses include Stipa viridula and Agropyron spp. Total cover is about 85 percent. A few plants occur upstream. A complete list of associated taxa includes:

Achillea millefolium
Agropyron caninum
A. smithii (sparse)
Apocynum androsaemifolium
Carex torreyi
Crataegus sp.
Galium boreale
Lactuca oblongifolia
Mahonia repens
Pinus ponderosa
Poa pratensis
Prunus virginiana (saplings)
Rosa acicularis
Smilacina stellata
Symphoricarpos occidentalis
Stipa viridula
Thalictrum venulosum
Vicia americana

2. Topography: The single study area population occurs on a narrow, north-facing terrace above a small drainage, with slight, 2-5 percent slope. The elevation is app. 1145 m (3760 ft), with a few plants at app. 1170 (3840 ft) along the nearby roadside.

3. Soil relationships: The soil is a brown, sandy loam, with a developed litter layer.

E. Population biology and biological interactions

1. Population size and condition: There were an estimated 400 flowering stems within ca. one acre in early July (see following paragraph). Most of the plants were in an area of ca 30 x 30 m (33 yds). In late August there were an estimated 200 stems, the decrease apparently due to trampling or grazing by cattle.

2. Reproduction: The few fruits that were observed were found early in the season. On 28 August only one plant was observed with fruit, indicating a season of poor pollination and little seed set. The species spreads extensively by rhizomes so that the flowering stem tally represents ramets rather than genets. The genus in general is adapted for cross-pollination in having stigmatic glands that adhere to insect visitors along with pollen masses (pollinia) for conveyance to other plants (Hitchcock et al. 1984).

3. Competition: Due to its spreading by rhizomes the species seems competetively well-adapted to survive in the dense grass and shrub cover at the site. It doesn't, however, extend into nearby dense _Agropyron_ _smithii_ grassland.

4. Herbivory: The ca 50 percent decrease in the population from early July to late August was probably because the area went from moderately to heavily grazed within this time, and a few individuals had been cropped. It is likely that most plants were mechanically damaged rather than grazed because the latex in this genus is unpalatable to most animals.

F. Assessment and management recommendations: This species is detrimentally affected by late season grazing. Exclusion from grazing or a shift in the period of grazing to earlier in the season would diminish the threats. Revisits to determine seed set are appropriate to include in assessing its management response. This species was not found in the South Dakota units, is a peripheral species addition to the Montana flora, is affected by management actions, and is recommended for designation as sensitive.

Asclepias _stenophylla_ Gray
Asclepiadaceae
Narrow-leaved milkweed

A. Description

1. General description: Herbaceous perennial, stems mostly single or sometimes paired from a stout rootstock, prostrate, decumbent or upright; usually simple, 25-51(91) cm (10-20 in), puberulent to glabrate. Stamens evolved into a column to which are attached sac-like "hoods", each hood with an incurved "horn" appendage. Early flowering was in progress on 12 June 1994, and continued through 2 July in the study area. Plants could not be relocated on 28 August.

2. Technical description: Perennial herb from a stout vertical rootstock; stems solitary or occasionally paired, upright or decumbent from a mostly simple, thickened base, simple or occasionally sparingly branched, slender, 2-10 dm tall, puberulent to glabrate. Leaves mostly alternate to subopposite; blades linear, erect to moderately spreading, puberulent, apex narrowly acute, margins often revolute, base narrowly acute, petiole, if present, 1-2 mm long. Infloresences few to several, scattered in leaf axils of upper 1/3 - 2/3 of plant, 10- to 25-flowered; peduncles 1-4(15) mm long or more commonly none; pedicels slender, 0.5-1.1 cm long, puberulent. Flowers 7.5-9 mm tall, 1.1-1.2 mm wide; hoods narrowly oblong, attached in lower 1/4, erect, 3.3-3.8 mm long, somewhat fleshy, freely open above, the apex deeply emarginate and appearing 3-toothed or lobed, the shorter

Figure 3.
ASCLEPIAS STENOPHYLLA (syn. Acerates augustifolia)
From Gleason 1952

median lobe representing the apex of the horn which is adnate the entire length of the hood, plane ca 0.5 mm lower than the anther head, the margins with a prominent pair of lateral, basal lobes, the base deeply saccate; fleshy pads bilobed; anther head truncate-conic, 2.2-3 mm tall, 2.2-4 mm wide; anther appendages ca 0.6 mm long; anther wings rounded at base, deeply notched, without spurs, ca 1.5 mm long; corpusculum ca 0.5 mm long; pollinia ca 0.8 cm long. Follicles fusiform, erect on deflexed pedicels, 9-12 cm long, 0.7-0.8 cm thick, without tubercles, puberulent to glabrate; seeds broadly obovate, 5-6 mm long; coma tan, 2.5-3.5 cm long (Great Plains Flora Association 1986).

3. Diagnostic characteristics: <u>A</u>. <u>stenophylla</u> is best distinguished by its relatively broadly linear leaves, 1.5 to 8 mm (.03-.16 in) wide x 4 - 18 cm (1.62-7.1 in) long and its pale greenish white flowers that are 7.5 - 9 mm (.3-.35 in) tall. The multiple stems are often prostrate, lying flat on the ground, and the linear leaves are upright, appearing like blades of grass. Occasional specimens of <u>A. virdiflora</u> approach this habit, but the leaves are then slightly wider, mostly opposite, and the flowers are larger. The hoods of <u>A. stenophylla</u> are slightly toothed.

B. Present legal or other formal status

1. Federal

A. U.S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

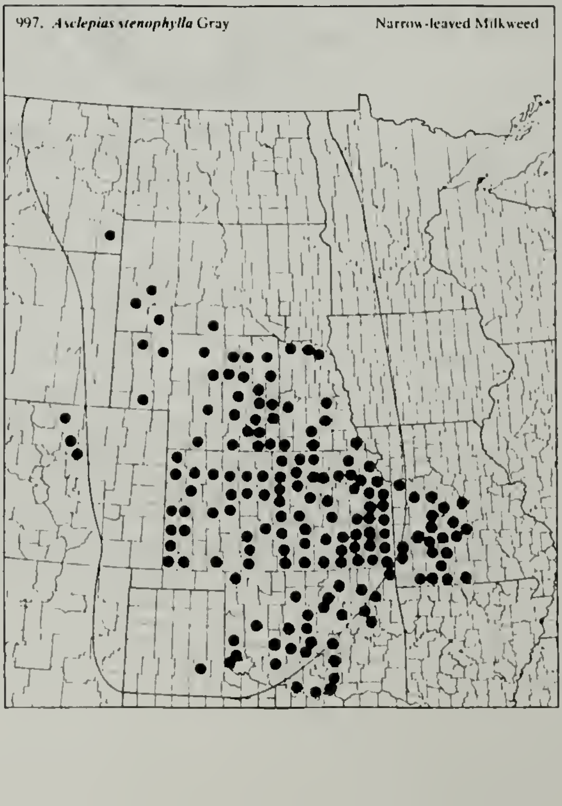
C. Bureau of Land Management: none

2. State: The species is given a state rank of "S1" indicating that it is critically imperiled.

C. Geographical distribution

1. Species range: Western Illinois to southeastern Montana, south to Colorado, western Arkansas, Texas.

2. Montana distribution: Narrow-leaved milkweed is only known from Carter County in the state, including one population in the Long Pines and one on Chalk Buttes.



997. *Asclepias stenophylla* Gray Narrow-leaved Milkweed

Note: Similar habitat occurs within the Long Pines in the vicinity of Plum Creek, northwest of Camp Crook (in T.2.S-R.62E.), only part of which has been searched. Further survey of this area in June or early July would be appropriate in the course of local resource evaluations and planning.

3. Occurrence in the study area: The two Sioux District populations of Asclepias ovalifolia are on Chalk Butte and the Long Pines. Their habitat is so highly localized that they are likely to be outlying populations for population centers possibly outside the Forest which were not located. It is not known from the South Dakota units of the District.

D. Habitat

1. Associated vegetation: In the Long Pines this species occurs on slightly grazed mixed-grass prairie, with approximately 70 percent bare ground and 20 percent graminoid cover. Scattered Pinus ponderosa are present near the edge of the grassland, mostly saplings. The grassland contains a mixture of several graminoids including Carex pennsylvanica, Koeleria macrantha, Aristida fendleriana, Dichanthelium wilcoxianum, and, near the margins of the grassland, Andropogon scoparius. A few forbs, typical of sandy sites, are present. They are Artemisia campestris, A. ludoviciana, Eriogonum annuum, Helianthus rigidus, Heterotheca villosa, Penstemon angustifolius, and Psoralea argophylla.

In the Chalk Buttes, the habitat is exposed prairie on ridge crests and butte top, dominated by Stipa comata, Carex filifolia, Calamovilfa longifolia, Andropogon scoparius, and Psoralea lanceolata. The areas are ungrazed.

2. Topography: The Long Pines population occurs on the south to southwest slope of a small hill in a valley bottom. The slope is slightly moderate, app. 10 percent, and straight to slightly convex. The elevation ranges from app. 1103 to 1110 m (3620 to 3640 ft).

3. Soil relationships: The soil at both population sites is a fine brown sandy loam. A blowout occurs in very sandy soil just below the Long Pines site.

E. Population biology and biological interactions

1. Population size and condition: The Long Pines population consists of six plants, with multiple stems, within an area of less than one acre. All plants appeared healthy in June and early July, no plants were found in late August. No fruits were ever observed, and it is likely that the plants dried out during the late drought of July-August.

The Chalk Buttes population consists of six vigorous single-stemmed plants, scattered along 1.6 km (1 mi) of ridge top. It is possible that both the Chalk Buttes and Long Pines populations are waifs, with core populations elsewhere, since they are occur on restricted microhabitat.

2. Reproduction: It is not known if seed production occurred since no plants were found in late August, and no fruits were observed at any time. It is possible that the plants underwent normal dessication during the July-August drought in the area, and that nothing remained to be seen.

The genus in general is adapted for cross-pollination in having stigmatic glands that adhere to insect visitors along with pollen masses (pollinia) for conveyance to other plants (Hitchcock and Cronquist et al. 1984).

3. Competition: Both populations occur on a relatively sparse vegetation, though not on unvegetated habitat. This suggests that the species is an early-succession species but not a pioneer, and can not compete with denser and taller grass cover.

4. Herbivory: The decumbent habit of the plant, growing flat on the ground, makes it almost unavailable for cattle grazing. Species of this genus are unpalatable due to the milky latex. Concentrated trampling by cattle could be deleterious at the Long Pines site, but this not likely due to the open nature of the site, the sparse vegetation, and lack of livestock improvements such as stock tanks, where cattle tend to congregate.

F. Assessment and management recommendations: The _Asclepias stenophylla_ did not produce viable fruits in 1994, populations are small, and the rest of District information is preliminary for evaluating status, so we recommend it for further consideration by Custer National Forest as a watch species.

No threats are present at the Chalk Buttes site. None of the threats are imminent at the Long Pines site, though it is a short distance from a Forest Service road, and could be affected by road construction, or "borrowing" of the sandy soil. Expansion of the blowout could also impact the population, though the current level of livestock use does not appear to be harmful, and may be beneficial in keeping back invasion of more vigorous grasses. The blowout appears to have formed along an old cattle trail, and would be analagous to blowouts formed along game trails. It contains two other rare species (_Dichanthelium wilcoxianum_, _Penstemon angustifolius_), and in its present condition appears as a natural part of the landscape.

Carex torreyi Tuckerm.
Cyperaceae
Torrey's sedge

A. Description

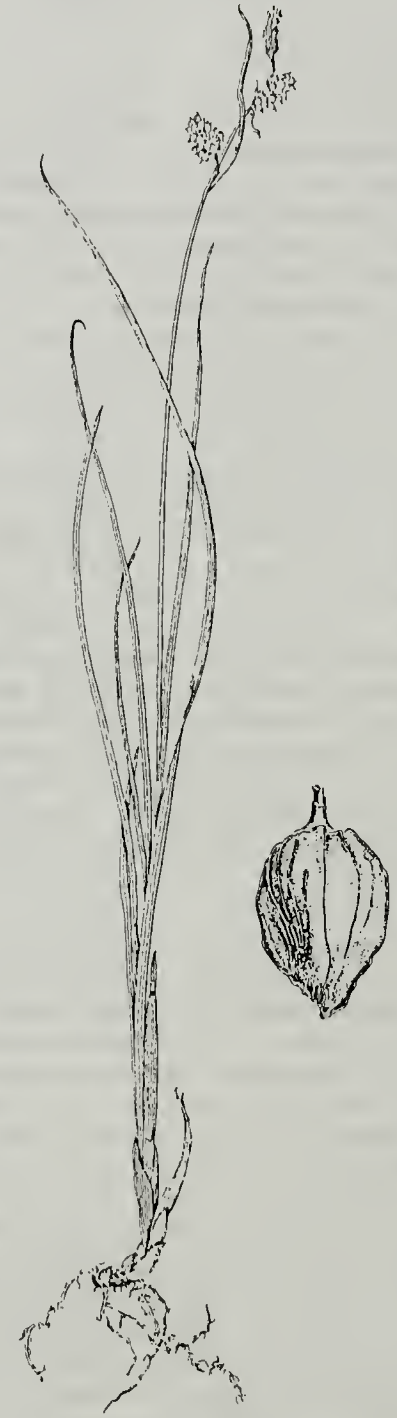
1. General description: Multiple-spiked sedge that typically forms tufts of plants; with mostly 3 stigmas, and trigonous achenes which are pubescent. The staminate and pistillate spikes are on the same culm, the bracts are sheathless, and the leaf blades are well-developed (from Hermann 1970). One population was maturing fruit on 11 June 1994. On 2 July most plants in two other populations were in late fruit stage, and many fruits had already dispersed. Investigation of one site in late August did not locate any fruits.

2. Technical description: Cespitose from short-prolonged rootstocks; culms slender, erect, 2.5-4 dm. high, short-pubescent, very rough above, red-tinged at the base, usually exceeding the leaves; leaves 2 or 3 to a culm, on the lower one-third of the culms, short-pilose, flat with somewhat revolute margins, 1.5-3.25 mm wide, the sheaths tight, soft-pubescent, cinnamon-brown tinged, deeply concave at the mouth, the conspicuous ligule longer than wide; terminal spike staminate, linear-clavate, usually short-peduncled, 8-16 mm. long, 2-4 mm wide; pistillate spices 1-3, short-oblong, -12 mm long, 4-7 mm wide, closely 10-25-flowered, erect, sessile of short-peduncled, approximate or the lowest somewhat separate; bracts sheathless or nearly so, the lowest as long as or longer than the inflorescence, the uppermost much smaller; scales ovate-orbicular, the lower acuminate, the upper acute, about half the length of the perigynia, reddish- to brownish-yellow with broad hyaline margins and three-nerved, green center; perigynia ascending, broadly ovoid or obovoid, 2.5-3.2 mm long, 1.9-2.2 mm wide, obscurely trigonous in cross-section, round-tapering at the base into a broad stipe, puncticulate, glabrous, yellowish-green, strongly many-ribbed (fine), abruptly rounded and depressed at the apex and abruptly short-truncate-beaked; achenes obovoid, trigonous with concave sides, 2.5-1.75 mm, substipitate, and short-apiculate (Hermann 1970).

3. Diagnostic characteristics: The most distinguishing character of the species is its inflated perigynium with a short, 0.1 to 0.6 mm (.004-.023 in) beak. It somewhat resembles a very minute watermelon, which tapers slightly towards the base, with a short but obvious beak on top. In addition, the lower bracts are sheathless or nearly so, and the lowest bract is shorter or equal to the length of the infloresence. Lower spikes are mostly erect, and the terminal spike is entirely staminate (from Hermann).

Figure 5.

CAREX TORREYI
From Hermann 1970



B. Present legal or other formal status

1. Federal

A. U.S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: none

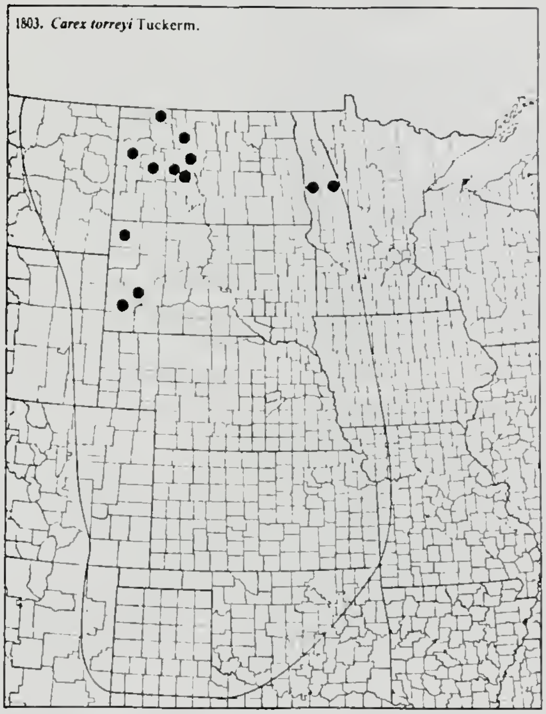
2. State: The state rank for this species was "S1" indicating that it may be critically imperiled. It is now known from six sites in three widely-scattered counties. This study provides basis for changing its state rank to "S2" as a state species of special concern.

C. Geographical distribution

1. Species range: Manitoba to Alberta, south to Colorado, South Dakota and Minnesota.

2. Montana distribution: An historic collection was made in 1889 from Choteau County, three populations are now known from Custer National Forest in Carter County, and two collections were also made of this species recently in Big Horn County.

3. Occurrence in the study area: This species occurs on the Ekalaka Hills and two locations in the Long Pines. It is not known from the South Dakota units of the District.



1803. *Carex torreyi* Tuckerm.

D. Habitat

1. Associated Vegetation: Within the study area <u>Carex torreyi</u> occurs on sheltered slopes within stands of <u>Pinus ponderosa</u>. The trees generally range from 15 to 20 cm (6-7.9 in) dbh, and canopy coverage is from less than 20 to about 30 percent. Shrub cover ranges from 20 to 50 percent, and consists mostly of low-growing species such as <u>Mahonia repens</u>, <u>Prunus virginiana</u> saplings (less than 0.5 m tall), <u>Toxicodendron rydbergii</u>. Graminoid cover is usually minute, but in one case it is 70 percent. A variety of species includes several species of <u>Carex</u>, <u>Bromus ciliatus</u>, <u>Poa pratensis</u>, and <u>Stipa nelsonii</u>. Forbs range from 1 to 20

percent in cover, and include Galium boreale, Apocynum androsaemifolium, Arenaria lateriflora, and Smilacina stellata. A complete list of plant species observed associated with Carex torreyi includes:

Achillea millefolium
Apocynum androsaemifolium
Arctostaphylos uva-ursi
Arenaria lateriflora
Arnica cordifolia
Asclepias ovalifolia
Bromus ciliatus
Carex brevior
C. foenea
C. rossii
C. sprengellii
Fragaria virginiana
Galium boreale
Heuchera richardsonii
Juniperus communis
Lomatium triternatum
Lychnis drummondii
Mahonia repens
Pinus ponderosa
Poa pratensis
Populus tremuloides (saplings)
Prunus virginiana (saplings)
Ribes oxyacanthoides
Rosa acicularis
R. woodsii
Rubus idaeus
Smilacina stellata
Smilax herbacea
Stipa nelsonii
Symphoricarpos occidentalis
Taraxacum officinale
Thalictrum venulosum
Toxicodendron rydbergii
Tragopogon dubius

2. Topography: Carex torreyi typically occurs on northeast- and north-facing slopes of ridges or mesas, but within drainage valleys on the slopes, at a change in slope from (or to) steep slopes to slight or moderate ones, of from 2 to 10, and occasionally 20 percent. They often occur at the junction with another side drainage. Elevations range from 1146-1204 m (3760 to 3950 ft), but the greatest within any single population is 30.5 m (100 ft).

3. Soil relationships: Soils are a dark sandy loam with a rich humus component, and typically a thick layer of pine needle litter. The location of the populations at the change

from steep to moderate slopes, and at the junction of side drainages enhances seasonal moisture, but the soils are typically fairly dry.

E. Population biology and biological interactions

1. Population size and condition: Populations range in size from 20 to app. 70 plants. Identification of individual plants is difficult due to the loosely cespitose growth form. Areas occupied are from 2 to 3 acres, but the plants are concentrated in patches within this area, the largest patch being about 15 x 20 m (16 x 22 yd) in size.

2. Reproduction: Outcrossing by wind pollination is common in the genus. Carex torreyi also reproduces vegetatively by rootstock offshoots on the perimeter of cespitose clumps.

3. Competition: Carex torreyi co-exists with the highly competitive Poa pratensis at one locality, but it is not known if the species is holding its own or if it is on the decline.

4. Herbivory: In most sites, within pine forests, grazing intensity is not high and does not affect the species. At the subpopulation at Maverick Spring intensity is high, and Poa pratensis and C. sprengellii are heavily grazed, but C. torreyi was apparently avoided. Trampling of populations near water sources is indirect impact.

F. Assessment of management recommendations: Information is incomplete for evaluating threats to and trends of Carex torreyi; therefore watch status is recommended at this time. Grazing has probably decreased the Maverick Spring subpopulation, either through direct impact, or more likely through enhancement of highly competitive non-native grass cover. This subpopulation contains only a couple of plants; the other subpopulations here are not affected, and might be made site of monitoring studies if the species becomes sensitive.

The sites within the Long Pines were relatively untouched by the 1988 Brewer Fire, with possibly only light ground fires that did not remove canopy cover.

Probably the greatest potential threat to the species is logging, which would stress its mesic environment and promote encroachment of exotic species or native species that are better suited to competition under altered conditions. It does not appear to be present in the South Dakota units of the District, and may warrant further consideration as a watch species based on limited numbers and potential threats.

Dichanthelium wilcoxianum (Vasey) Freckmann
Poaceae
Wilcox's panic grass

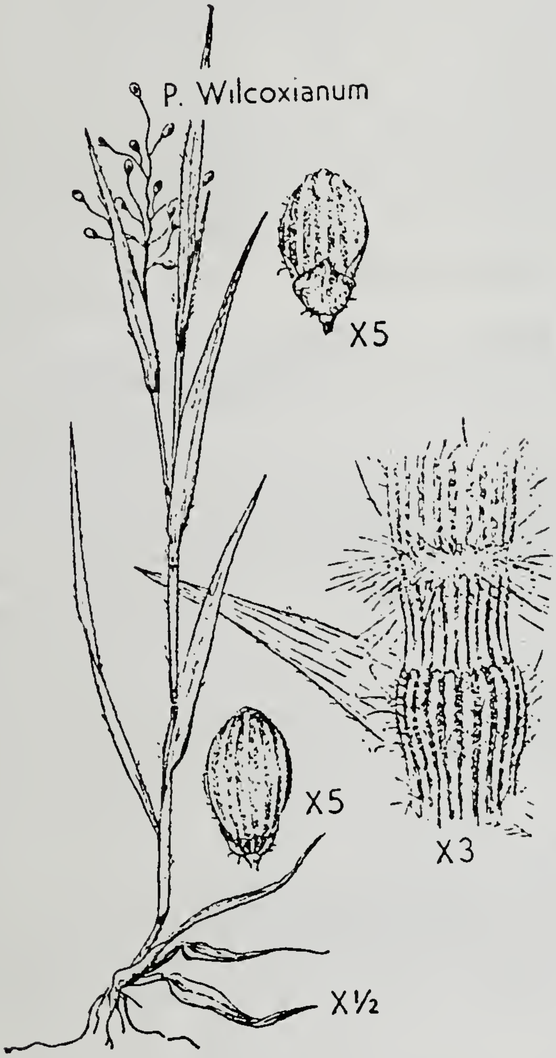
A. Description

1. General description: Perennial grass forming a winter rosette with basal leaves distinctly different from growing season culm leaves. The blades are not elongate, the culms are branched at the nodes, and the blades are erect throughout the plant giving it a distinctly tufted appearance. Spikelets are blunt, inflated, strongly nerved. Sheaths 3-4 mm (.12-.16 in) long, sheaths papillose-hispid, but leaves not velvetey and nodes not bearded or obscurely so. Panicle narrow, branches erect or spreading only at anthesis (from Hitchcock 1971). The species is reported to flower primarily from May to June, with some secondary blooming continuing until fall (Great Plains Flora Association 1986). Within the study area, the populations were mostly in early fruit by 12 June. On 2 July, some fruit dispersal had occurred, and pubescence on some glumes was diminishing. Late fruit production was observed on 28 August.

2. Technical description: Vernal culms 10-25 cm tall, copiously papillose-hirsute, as are sheaths and blades; ligule 1 mm long; blades firm, erect 5 to 8 cm long, 3 to 6 mm wide, usually involute-acuminate; panicle 2 to 5 cm long; spikelets 2.7 to 3 mm long, papillose-pubescent;. Autumnal culms branching from all the nodes, forming bushy tufts with rigid erect blades (Hitchcock 1971).

3. Diagnostic characteristics: This species is easily distinguished within the study area by its habit and leaf pubescence. The plants are small, generally 1.5 dm (5.9 in) or less, with pubescent stems much branched from the base, forming small clumps. The leaf blade is hirsute, especially obvious along the margins. The blades diverge characteristically from the stems at a sharp, upward angle, forming a "V" shape, and end with a point. The spikelets are typically "hidden" among the leaves and stems, rarely exceeding them, and are usually much shorter. They are distinctly pubescent (although a few individual spikelets may tend to lose the hairs with age). This combination of characters is distinctive and insures separation from any other grass. The most distinguishing character of the species is its inflated perigynium with a short, 0.1 to 0.6 mm (.004-.024 in) beak. It somewhat resembles a very minute watermelon, which tapers slightly towards the base, with a short but obvious beak on top. In addition, the lower bracts are sheathless or nearly so, and the lowest bract is shorter or equal to the length of the infloresence. Lower spikes are mostly erect, and the terminal spike is entirely staminate (from Hitchcock 1971).

Figure 6.
DICHANTHELIUM WILCOXIANUM
From Gleason 1952



B. Present legal or other formal status

1. Federal

A. U.S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: none

2. State: In Montana, Wilcox's panic grass had a state rank of "S1", meaning that it was critically imperilled within the state. This was based on a single collection record from Fort Keogh Experiment Station that had only recently been recognized as a part of the state flora (Heidel in progress). The present study has provided basis for changing its state rank to "S3S4", indicating that it may still be vulnerable or potentially secure in the state but no longer warrants tracking as a species of special concern.

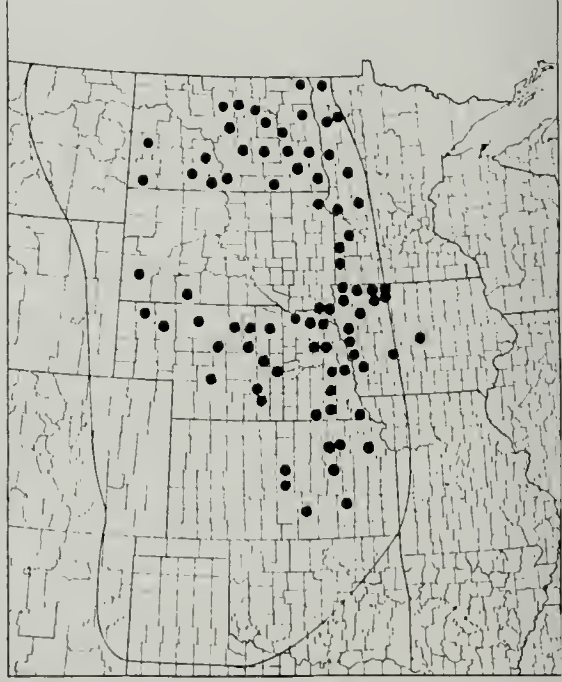
C. Geographical distribution

1. Species range: Manitoba to Alberta, south to Illinois, Kansas, Colorado and New Mexico.

2. Montana distribution: First collected in Montana in the Fort Keogh Agricultural Station in Custer County.

3. Occurrence in the study area: Documented from five sites in the Ekalaka Hills and five sites in the Long Pines, in addition to the North Cave Hills in South Dakota. More Montana populations are likely to exist in the Long Pines, the Ekalaka Hills, and probably on the Chalk Buttes.

2045. *Panicum wilcoxianum* Vasey   Wilcox Panicum



D. Habitat

1. Associated vegetation: The species occurs within a wide variety of settings. It appears to be an infrequent component of mixed-grass prairies on hillsides, and butte and ridge tops, with a minimal amount of bare ground. Sometimes this grades into a little bluestem prairie. Grasses consist of Bouteloua gracilis, Koeleria macrantha, Stipa comata, and

others, but usually these prairies have been intensively grazed and *Poa pratensis* is the prevalent grass, indicating replacement of the native species. *Selaginella densa* is abundant at some sites, which is probably also an indication of heavy grazing.

Other sites are more open, with a sparse vegetative cover, and include sandy "blowouts" and steep, rocky, gravelly mesa slopes. At one site *Dichanthelium wilcoxianum* is one of the major components of the sparse vegetation after a canopy-removing wildfire.

A complete list of associated taxa includes:

Achillea millefolium
Agropyron smithii
Allium textile
Ambrosia psilostachya
Andropogon scoparius
Antennaria microphylla
Aristida fendleriana
A. campestris
A. dracunculus
A. frigida
A. ludoviciana
Asclepias stenophylla
Aster falcatus
Astragalus adsurgens
Anemone patens
Besseya wyomingensis
Bouteloua gracilis
Calamovilfa longifolia
Carex pennsylvanica
Cerastium arvense
Dalea purpurea
Echinacea angustifolia
Eriogonum annuum
Glycyrrhiza lepidota
Agrostis scabra
Danthonia intermedia
Hedeoma hispidum
Helianthus rigidus
Heterotheca villosa
Koeleria macrantha
Liatris punctata
Lygodesmia juncea
Oxytropis lambertii
Penstemon angustifolius
Phlox hoodii
Pinus ponderosa
Poa pratensis
P. sandbergii
Psoralea argophylla
Ratibida columnifera
Rosa arkansana
Selaginella densa
Smilacina stellata
Stipa comata
S. viridula
Symphoricarpos occidental.
Taraxacum officinale
Tradescantia occidentalis
Tragopogon dubius

2. Topography: The *Dichanthelium wilcoxianum* occurs in a variety of topographic positions including flat ridge and mesa tops, upper steep mesa slopes (to 20 percent), and on midslopes, occasionally lower slopes of hillsides situated on mesas and ridges and within valley systems. Aspect varies from open, to W, SW, SE, and NE. The elevation ranges from 1067-1043 m (3500 to 4800 ft), but within any one population the range is very small, usually less than 10 m (31 ft).

3. Soil relationships: Most soils on hillsides and some mesa tops are brown, sandy loam. Loamy sand is present in one blowout, and gravelly, rocky sand is present on some mesa and

ridge slopes. The largest populations observed occur in the latter situation.

E. Population biology and biological interactions

1. Population size and condition: Populations are generally small and highly localized. Most consist of one to six clumps, a few range from 20 to 50 or 60. The largest populations generally occur within areas of sparser vegetation. The plants usually occupy an area of less than an acre. The plants appeared healthy, even vigorous in some locals. It is probable that more individuals are present in the area around the extreme small populations of one or two plants observed at some sites.

2. Reproduction: Expansion of the populations are by seed, while the clumps can expand vegetatively by new basal shoots. Members of this genus have two seed crops each year, produced from early-season monoecious outcrossing flowers that do not consistently produce seed, and from cleistogamous late-season flowers that regularly produce seed.

3. Competition: Its presence in bluegrass pasture indicates some ability to survive competition from shorter grasses. It occurs with *Andropogon scoparius* only sparingly, and within areas opened by grazing. Two of the larger populations exist on sparsely vegetated sandy or rocky, gravelly slopes, indicating a colonizer status for the species. Some populations are within areas heavily burned by the 1988 Brewer Fire in the Long Pines, and locally common.

4. Herbivory: No signs of grazing were found. The habit of short, sharp, pubescent leaves and short stature limit its use. Moderate grazing on some sites has decreased taller grass cover and may have enhanced the population of *Dichanthelium* through restriction competition and in opening up areas of soil for colonization. On the other hand, several of the smallest populations occur in heavily grazed bluegrass pasture, suggesting that replacement of native grasses by the sod-forming *Poa pratensis* may limit the populations through competition, rather than direct grazing.

F. Assessment and management recommendations: The number of populations and the neutral or positive response to disturbance provides the basis for recommending that it be deleted from further consideration by the U.S. Forest Service and by the Montana Natural Heritage Program.

Penstemon angustifolius Nutt. ex Pursh
Scrophulariaceae
Narrowleaf penstemon

A. Description

1. General description: Perennial herb usually 1.5-4.5 dm (6-18 in) arising from a woody crown, with distinctively firm, glaucous leaves. The flowers have glabrous anthers and a corolla which is glabrous externally, making up an infloresence in a tight compound cluster. The sepals are less than 7 mm (.28 in) long, and the cauline leaves are linear to lanceolate or lanceolate, short to long acuminate or acute (from Great Plains Flora Association 1986).

2. Technical description: Slender to stout herbaceous perennial, stems erect to assurgent, (1)1.5-4.5(6.5) dm tall, glabrous or scabrid-puberulent and usually distinctly glacous, 1-5(10) stems arising from a woody crown or short-branched woody caudex surmounting a taproot. Leaves entire, glabrous to sparingly oblanceolate, (2.5)4-9 cm long, 0.2-1.8 cm wide, acute to obtuse, subsessile to petiolate, the petioles usually winged; cauline leaves linear to lanceolate or lance-ovate, 3-11 cm long, leaves equaling or commonly much longer than the internodes. Thyrse 4-30 (37) cm long, with (3)5-15 (26) verticillaster, distinctly interrupted to compact, cylindrical and not secund, cymes (2)4- 8(10)-flowered; bracts lanceolate to lance-ovate or seldom ovate, gradually reduced upward, acute to long-acuminate, bases scarcely clasping to cordate-clasping and overlapping, lower bracts occasionally concealing the pedicels in wide-bracted plants. Calyx glabrous and glaucous to scarcely scabrid-puberlent, lobes lanceolate to lance-ovate, 4-8 mm long, 1-2.5 mm wide, acute or more frequently acuminate, margins scarious, particularly near the base, entire to sub-erose; corolla 14-20(23) mm long, tubular-salverform, moderately ampliate and scarcely ventricose anteriorly, plaited internally and lined on the lower lips projecting to spreading, palate glabrous or sparingly pubescent with whitish densely bearded at the tip with golden-yellow hairs to 1 mm long and more sparingly bearded for slightly more than 1/2 its length; anther sacs (0.9)1.1-1.5 mm long, papillose along the sutures, divergent, dehiscing nearly to the apices and across the connective, not becoming explanate; style glabrous. Capsule 9-14 mm long; seeds 2.5-3.5 mm long, angular, brown to dark brown (Great Plains Flora Association 1986).

3. Diagnostic characteristics: The most distinguishing characters are the firm linear to narrowly lanceolate or oblanceolate leaves, many of them over 7X as long as wide, with narrow, lanceolate bracts in the inflorescence, usually glaucous appearing, and the plant being completely glabrous. This serves to distinguish the species in the study area even

Figure 7.
PENSTEMON ANGUSTIFOLIUS (Note: NOT P. a. var. angustifolius)
From Cronquist et al. 1984

after the flowers have fallen. The flowers are bright blue, tending to be purplish near the base, fading to light blue, and have glabrous anthers. It closely resembles P. nitidus except for the narrow leaves and the large anther sacs which are 1.1-1.5 mm (.04-.06 in) vs. 0.7-1.2 mm (.028-.047 in; from Great Plains Flora Association 1986).

B. Present legal or other formal status

1. Federal

A. U.S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: none

2. State: This species had a state rank of "S1" critically imperiled since it had been known from four locations statewide. As a result of this study, its rank is being reassigned as "S2" with the discovery of six additional occurrences in Carter County.

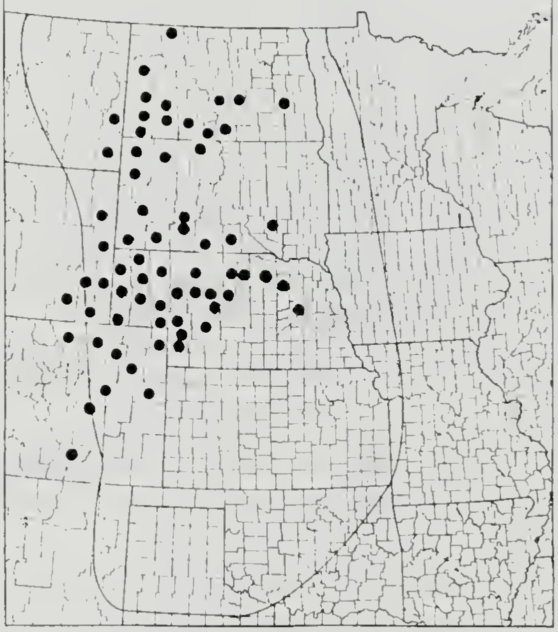
C. Geographical distribution

1. Species range: North Dakota to eastern Montana, south to northwest Arizona to Oklahoma.

2. Montana distribution: Narrowleaf penstemon is known from Carter and Dawson County in easternmost Montana. In addition, there is a putative specimen from Missoula County which warrants review and annotation/verification.

3. Occurrence in the study area: It occurs in both the Ekalaka Hills and the Long Pines. Its potential habitat was not thoroughly searched. It was also found in the Slim Buttes and South Cave Hills of South Dakota.

1231. *Penstemon angustifolius* Nutt. ssp. *angustifolius* Narrow Beardtongue



D. Habitat

1. Associated Vegetation: The species typically occurs in open or deflated areas on moderate slopes with sparse

vegetation. Bare ground is above 60 and usually closer to 90 percent, while graminoid cover usually ranges from 3 to 20 percent. Shrub cover is absent or minimal.

The surrounding vegetation is generally mixed-grass prairie grading into little bluestem grassland. Graminoid cover is provided by patches (usually) of Carex filifolia, Bouteloua gracilis, and scattered Andropogon scoparius and Calamovilfa longifolia in some sites. Typical scattered forbs include Helianthus rigidus, Artemisia campestris, Tradescantia occidentalis, and Heterotheca villosa. Yucca glauca is occasionally present. A complete list of associated taxa includes:

Agropyron smithii
A. spicatum
Andropopgon hallii
A. scoparius
Artemisia campestris
A. frigida
Asclepias pumila
A. stenophylla
A. viridiflora
Astragalus ceramicus
A. flexuosus
Bouteloua gracilis
Calamovilfa longifolia
Calochortus nuttallii
Carex filifolia
Dichanthelium wilcoxianum
Eriogonum annuum
E. flavum
Helianthus rigidus
Heterotheca villosa
Koeleria macrantha
Lesquerella ludoviciana
Lithospermum incisum
Lygodesmia juncea
Melilotus officinalis
Orobanche fasciculata
O. ludoviciana
Oxytropis lambertii
Petalostemon purpureum
Pinus ponderosa (isolated trees, saplings)
Poa sandbergii
Psoralea argophylla
P. esculenta
Rhus trilobata
Rosa arkansana
Selaginella densa
Stipa comata
Tradescantia occidentalis
Yucca glauca

2. Topography: The Penstemon angustifolius occurs on moderate to slight (usually less than 10, but occasionally to 30 percent grade) upper and middle slopes of hills and ridges on mesa tops and within valley systems. Aspects are typically SW, S, to SE, but occasionally N or NE. Elevations range from 1039-1207 m (3410 to 3960 ft), but within any one population the range is often less than 10 m (31 ft).

3. Soil relationships: The plants typically occur on open slopes or within open or deflated areas within denser vegetation, such as blowouts, or cattle trails, sometimes 2-tracks. Many of the soils are sandy loams on hillsides, with gravelly or loamy sands on some ridges.

E. Population biology and biological interactions

1. Population size and condition: Populations range from 14 to about 60 individuals, with most consisting of 35 to 40 plants. Most occupy an area of an acre or less, and most of the plants are concentrated within small locales within the overall area, with a few individuals scattered between, e.g. along cattle trails or 2-tracks. Most of the populations appear healthy, with new shoots or rosettes, indicating recruitment. Some populations contain dead stems from the previous year, and a portion of one appears decadent, with old stems and sterile shoots.

2. Reproduction: Reproduction is primarily or exclusively by outcrossing.

3. Competition: The open nature of the habitat indicates little competitive ability. Within denser vegetation, P. angustifolius is concentrated within open areas, such as "blowouts", and scattered elsewhere in less intense conditions such as along cattle trails, 2-tracks, and in deflated areas. Open areas are probably necessary for seedling establishment. It appears that this species has been favored overall by reduction in canopy cover caused by crown fires in the 1988 Brewer Fire; though local segments of the population may have been killed under hot temperatures.

4. Herbivory: The plants are probably unpalatable, and grow within areas receiving only slight grazing impact. Browsing by wildlife is limited.

F. Assessment and management recommendations: This species is recurrent across a variety of District settings, and is under no immediate threats. It is recommended that it be dropped from further consideration by the U.S. Forest Service. It will remain on the Montana species of special concern list pending further study.

Phlox andicola E. Nels.
Polemoniaceae
Plains phlox

A. Description

1. General description: Herbaceous perennial with numerous fertile stems less than 10 cm (3.9 in) long, forming compact mounds. The narrow leaves are 2 mm (.08 in) wide or less, but 10-25 mm (.4-.98 in) long. The white flower has corolla lobes 6-8 mm (.24-.31 in) long (from Great Plains Flora Association 1986). Flowering is in June.

2. Technical description: Rhizomatous, cespitose perennial, 4-10(12) cm tall. Fertile shoots solitary or branching near the base, erect to decumbent, with 5-8(10) nodes, the herbaceous stems puberulent to arachnoid-pubescent. Blades linear to subulate, 10-25(30) mm long, 1-2 mm wide, nearly glabrous to pubescent or arachnoid-ciliolate proximally, the midrib prominently thickened, the tips pungent to acerose. Infloresence compact with 1-3(5) flowers; pedicels glabrous to weekly pilose, subsessile to 2(5) mm long. Calyx 6-11 mm long, arachnoid-pubescent along the margins of the lobes and near the summit of the tube, the tube about 1/2-2/3 as long as the calyx, the lobes subulate and pungent; corolla white, tubes 6-13(17) mm long, lobes obovate, obtuse, 6-8(9) mm long, 4-6(7) mm wide, style 5-9 mm long (Great Plains Flora Association 1986).

3. Diagnostic characteristics: The best characters are the white hyaline internodes combined with narrow leaves that are 1 cm or more in length, and somewhat widely spaced along the stem. P. hoodii has smaller leaves usually, which are more closely spaced, and usually stiff or pungent. P. alyssifolia has wider, thicker leaves, that have thickened margins.
The most distinguishing characters are the linear to narrowly lanceolate or oblanceolate leaves, many of them over 7X as long as wide, with narrow, lanceolate bracts in the inflorescence, usually glaucous appearing, and the plant being completely glabrous. This serves to distinguish the species in the study area even after the flowers have fallen.

B. Present legal or other formal status

1. Federal

A. U.S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: none

line illustration unavailable

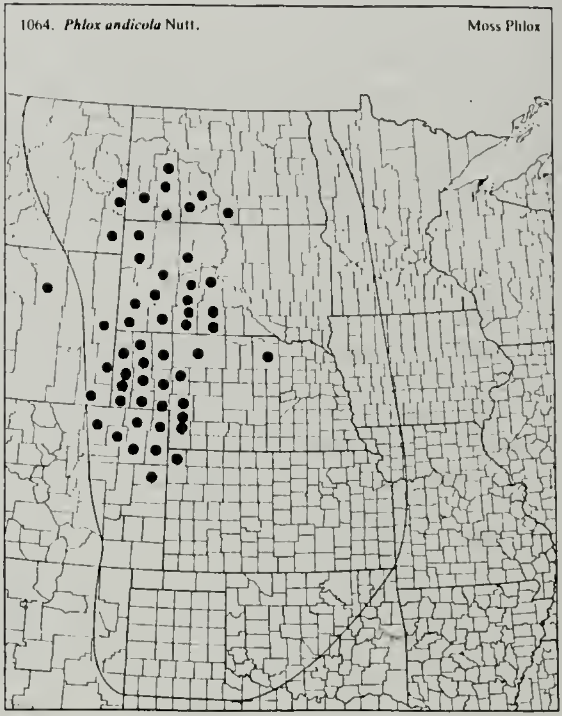
2. State: This species has a state rank of "S1" indicating that it is critically imperiled, based on a total of three records.

C. Geographical distribution

1. Species range: Western North Dakota to Alberta, south to Wyoming and western Nebraska.

2. Montana distribution: Moss phlox has been documented in Dawson County, and in Carter County in both the Long Pines and Medicine Rocks State Park.

3. Occurrence in the study area: This species has only been collected once in the Sioux District at the southeastern end of the Long Pines. Potential habitat in the north end of the Long Pines was not adequately surveyed. It was not found in the South Dakota units, but there is potential habitat in the Cave Hills.


1064. *Phlox andicola* Nutt. Moss Phlox

D. Habitat

1. Associated Vegetation: The species occurs on a sandy hillside with scattered <u>Pinus ponderosa</u> and <u>Rhus trilobata</u>. A few plants extend into adjacent mixed-grass prairie in open areas, e.g. along a 2-track trail. Associated species include:

Agropyron smithii
Artemisia frigida
A. ludoviciana
Bouteloua gracilis
Poa pratensis
P. sandbergii
Psoralea argophylla
Pinus ponderosa
Rhus trilobata
Viola sp.
Cerastium arvense
Fritillaria atropurpurea
Stipa comata
Calamovilfa longifolia
Koeleria cristata

2. Topography: The population occurs on the west and southern slopes of a small hill or knoll on a mesa top. Small sandstone outcrops are present. Elevation ranges from 3920 to 3940 ft.

3. Soil relationships: The soil is a very sandy loam. Most of the plants are growing in areas below sandstone outcrops.

E. Population biology and biological interactions

1. Population Size and Condition: The population consists of about 50 plants, mostly within an area of less than an acre, with a few individuals occurring up to 0.2 mile from the main area.

2. Reproduction: Outcrossing.

3. Competition: The plants grow in partial shade on slopes with sparse vegetation (ca 70 percent bare ground), but with abundant pine needle litter. A few plants are present in open ground along and near 2-tracks. This suggests that the species is not adapted for competition within denser grasslands.

4. Herbivory: The sparse vegetation does not make the site an area of high grazing impact.

F. Assessment and management recommendations: While major threats have not been identified for Phlox andicola, it is only known from one small population and further status review as a watch species is appropriate.

Physalis heterophylla Nees
Solanaceae
Clammy ground cherry

A. Description

1. General description: Herbaceous perennial 1.5-5 dm (6-20 in) tall, with a fleshy berry, the nodding fruit on a flowering pedicel usually over 10 mm (.5 in) long. Alternate leaves covered by glandular hairs (from Great Plains Flora Association 1986).

2. Technical description: Perennial herb with usually deeply buried caudex; stems usually erect, simple or much branched,1.5-5(9) cm tall. Pubescence of stems, foliage, and inflorescence of varying proportions of short, usually glandular hairs and long multicelled hairs 1-2(3) mm long. Leaves alternate, principal ones chiefly ovate but varying to rhombic, (3)5-10 cm long., 3.5-6 cm wide, margins irregularly sinuate-dentate or entire, rounded or subcordate at base, pubsecent on both sides; petioles 3-6 mm long. Pedicels ca 1 cm long at anthesis, to 3 cm long in fruit; calyx at anthesis 7-12 mm long, 5-12 mm wide, lobes deltoid or ovate; corolla yellow, sometime tinged with blue or violet, 3-4.5 mm long, filaments thickened, often as wide as anthers, usually clavate. Fruiting calyx ovoid (2.5)3-4 cm long, 204 cm wide, much inflated, evidently retuse at base; berry yellowish, (8)10-12 mm in diameter, seeds yellowish, ovate to transversely elliptic, 2-2.5 mm long, minutely pitted.

3. Diagnostic characteristics: There is little information on the distribution of all three species of ground cherry in Montana, and their ranges are likely to overlap. The three species are differentiated in the Great Plains Flora (1986) by pubescence characteristics. Physalis heterophylla differs from P. virginiana var. hispida in that it has glandular hairs rather than non-glandular, reflexed hairs. It differs from P. hederifolia in having longer fruiting pedicels that are 10-15 mm (.4-.6 in) long vs. 3-10 mm (.12-.4 in) long; as well as a typically bigger leaf that is 5-10 cm (.2-.4 in) long vs. 2-4 cm (.8-1.6 in) long.

B. Present legal or other formal status

1. Federal

A. U. S. Fish and Wildlife Service: none

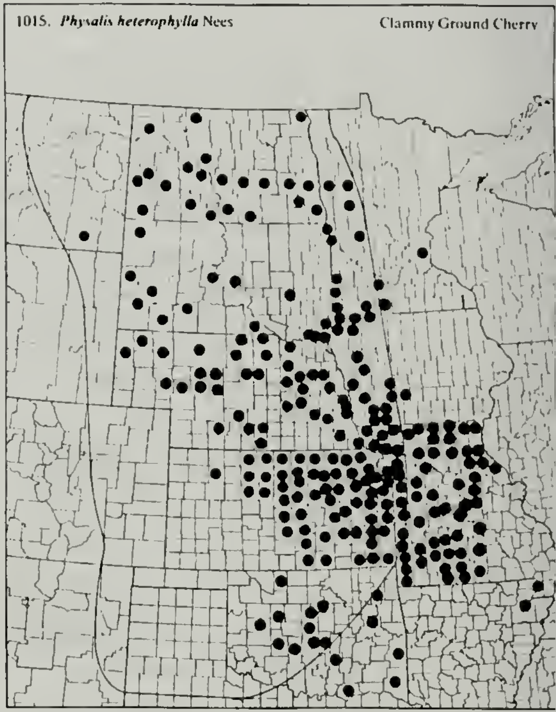
B. U.S. Forest Service: none

C. Bureau of Land Management: none

Figure 10.
PHYSALIS HETEROPHYLLA
From Cronquist et al. 1984

2. State: Dorn (1984) indicated that this species had been collected in southwestern and eastern Montana. The former is likely to be adventive, and the few records in eastern Montana were considered basis for giving it an "SU" (status undetermined rank). This study and further review of collection data supports a change to "SA" (adventive in much or all of its range in Montana).

C. Geographical distribution


1015. *Physalis heterophylla* Nees Clammy Ground Cherry

1. Species range: Quebec and Nova Scotia to eastern Montana, Utah, Texas and Florida.

2. Montana distribution: see above.

3. Occurrence in the study area: Collected in the northern end of the Ekalaka Hills.

D. Habitat

1. Associated vegetation: The associated species represent a plant association of disturbed habitat. In the Sioux District it was found at a roadside restricted to disturbed habitat with: Glycyrrhiza lepidota, Achillea millefolium, Vicia americana and Symphoricarpos occidentalis.

In the Medicine Lake Sandhills, an early successional site, it is associated with Psoralea lanceolata and Prunus virginiana.

2. Topography: Upland settings.

3. Soil relationships: Clammy groundcherry grows in sandy soils and other well-drained settings. The District site for it is confined to Forest Service road right-of-way, an extremely droughty setting.

E. Population demography and biology: NA

F. Assessment and management recommendations: Clammy groundcherry was found only in one highly disturbed setting. Based on this observation augmented by rangewide information, it is recommended that it be dropped from further consideration by the U.S. Forest Service and Montana Natural Heritage Program.

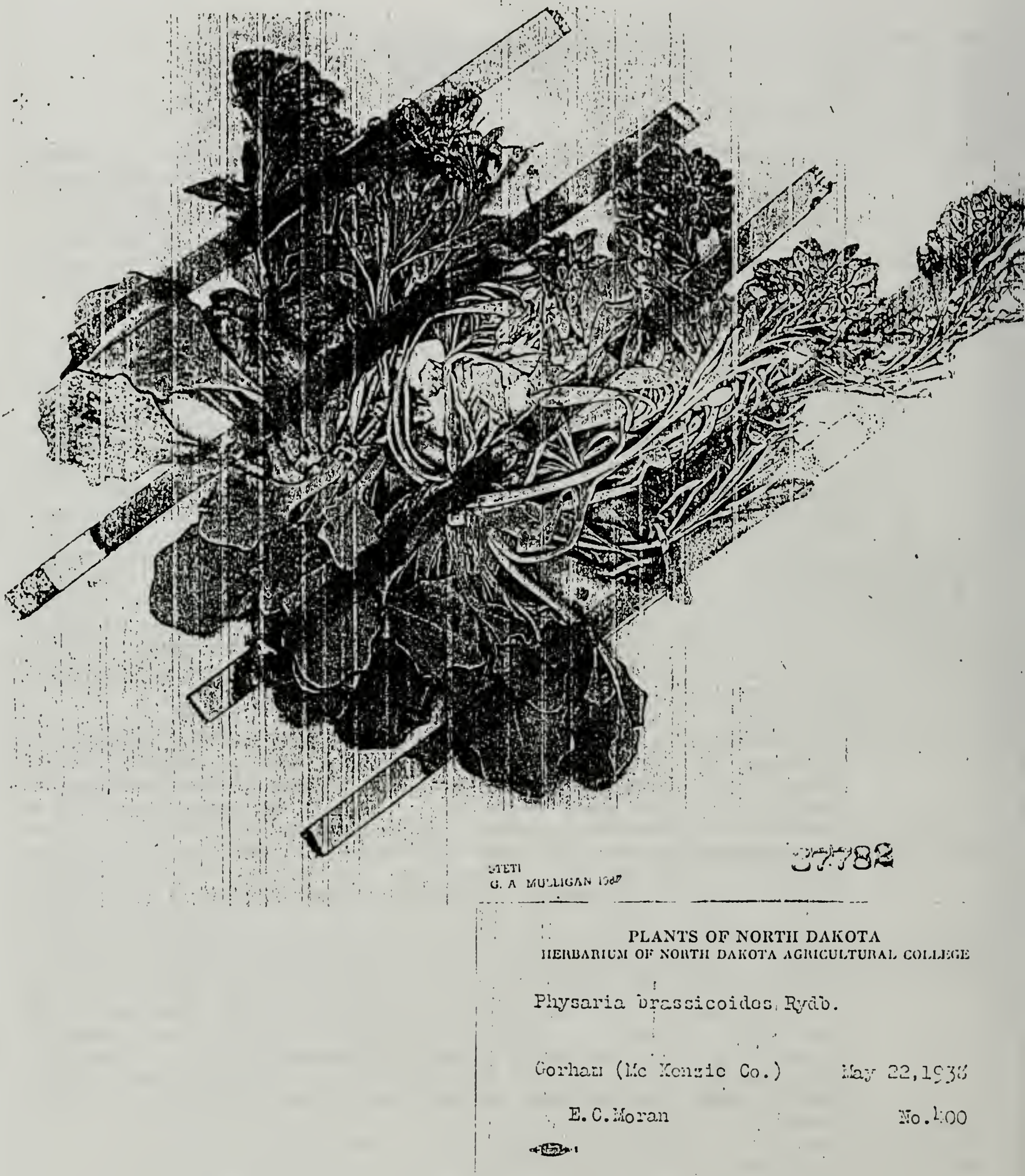
Physaria brassicoides Rydb.
Brassicaceae
Mustard twinpod

A. Description

1. General description: Herbaceous perennial forming basal rosettes, arising from a taproot. Leaves numerous, restricted to base and silvery grey throughout. Bright yellow flowers in raceme on multiple stems 5-15 cm (2-6 in) long. Fruits with two inflated capsules, indented at the top and the bottom. On 2 June 1994, most plants in one population were in early fruit, with a few still in flower. On 11 June plants, were in fruit, and on 2 July many fruits had dehisced.

2. Technical description: Cespitose perennial, silvery-stellate throughout, stellate with forked rays; stems several to numerous, rather stout for the genus, simple, arising laterally, 5-15 cm long including the fruiting racemes; Basal leaves numerous, thick, scurfy above, repand or rarely entire, 206 cm long, 1-2.5 cm wide, blades orbicular to obovate, petioles somewhat winged; cauline leaves few, oblanceolate to broadly spathulate, , obtuse to subacute, entire, 1-2 cm long, 3-5 mm wide. Petals yellow, spatulate. Fruiting pedicels divergent, straight or somewhat curved, 5-10 mm long. Siliques didymous, erect, cordate, moderately inflated. loosely but densely pubescent with spreading stellae, obtuse or with an obscure sinus at base, apical sinus deep and broad, valves 608 mm high. Replum linear-oblong, constricted, 3-4 mm long, ca. 1 mm wide. Styles 4-5 mm long. Ovules 2 per locule (Rollins 1993).

3. Diagnostic characteristics: The only other Physaria in eastern Montana is P. didymocarpa, which superficially resembles P. brassicoides. The fruit is needed to distinguish the two species with certainty. The P. brassicoides has a fruit with a cordate outline, indented only on the top, while P. didymocarpa has a "didymous" (dumbbell) outline, with deep sinuses (indentations) on both top and bottom of the silique. In addition, P. brassicoides has two funiculi per locule (and usually two seeds, but the funiculi are evident as small "pegs" along the upper portion of the fruit partition); a narrow, linear partition of the fruit (which can be observed by ripping off half of the fruit); and the fruit itself, which is more deeply indented above than below. Also, the hairs of the basal leaves, under 10x magnification, are readily apparent as stellae, with slightly ascending arms. Note: P. didymocarpa Rydb. is not known from the South Dakota flora (from Great Plains Flora Association 1986, Hitchcock et al. 1984).



DET
G. A. MULLIGAN 1967

37782

PLANTS OF NORTH DAKOTA
HERBARIUM OF NORTH DAKOTA AGRICULTURAL COLLEGE

Physaria brassicoides Rydb.

Gorham (Mc Kenzie Co.) May 22,1938

E. C. Moran No.400

48 xerox of MONT specimen

B. Present legal or other formal status

1. Federal

A. U.S. Fish and Wildlife Service: none.

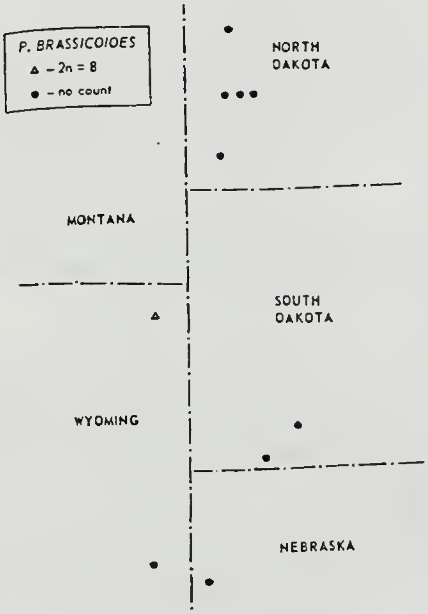
B. U.S. Forest Service: none

C. Bureau of Land Management: none

2. State: This species has a state rank of "S1" indicating it may be critically imperiled, based on only two known populations with limited populations.

C. Geographical distribution

1. Species range: Great Plains endemic, extending from North Dakota to Nebraska, eastern Wyoming and Montana. In keeping with the treatment of Mulligan (1968) it is known from five states in a relatively narrow range marking that of a regional endemic. It was previously cited as *Physaria didymocarpa* in the Great Plains, reported from Harding, Haakon, Jackson and Sheridan counties, SD, and Billings, McKenzie and Slope counties, ND (Great Plains Flora Association 1977). Later, it was apparently mistakenly reported for the northern Rocky Mountains (Great Plains Flora Association 1986) when correctly treated as *P. brassicoides*.



Distribution of *P. brassicoides*.

(Mulligan 1968)

2. Montana distribution: *Physaria brassicoides* is now known from two populations in Carter County, discovered as an addition to the state flora in the course of this study. It is included in Dorn (1984) as "expected" in Montana, being known from adjoining counties in Wyoming.

3. Occurrence in the study area: Both populations of Mustard twinpod are in the Ekalaka Hills. It was not found in the South Dakota units.

D. Habitat

1. Associated Vegetation: The species occurs on steep, sparsely vegetated slopes of ridges, within valley systems. Most of the substrate is barren, but there are clumps of

various shrubs and other species, in aggregate forming less than 10 percent cover. Typical shrubs are Rhus trilobata, and low forms of Amelanchier alnifolia and Prunus virginiana. Clumps of Agropyron spicatum and Andropogon scoparius are present at one site, Oryzopsis hymenoides at another.

A complete list of associated taxa is:
Agropyron spicatum
Allium textile
Amelanchier alnifolia
Andropogon scoparius
Astragalus missouriensis
Chaenactis douglasii
Commandra umbellata
Gaura coccinea
Heterotheca villosa
Ipomopsis congesta
Lesquerella alpina
Lupinus pusillus
Oryzopsis hymenoides
Petalostemon candidum
Prunus virginiana
Psoralea esculenta
Rhus trilobata
Rumex venosus
Solidago missouriensis
Stephanomeria runcinata
Tradescantia occidentalis
Yucca glauca

2. Topography: The species occurs on steep, southerly slopes at mid and lower slope positions along ridges within valley drainages. Elevation at one site is from app. 1085-1091 m (3560 to 3580 ft), and from 1134-1149 m (3770-3720 ft) at the other site.

3. Soil relationships: The soil is a loose, unstable, brown, gravelly sand. Outcrops of decaying soft sandstone are present on one site. At another, the sandy soil may overly clay or shale soils or bedrock. Typically the upper soil is loose and shifting, and may be bounded above and below by clay or shale bedrock. One subpopulation occurs along a sandy slump just above a roadcut.

E. Species biology, population biology and biological interactions

1. Population size and condition: Populations were app. 20 and 40 plants, both occupying an area of less than an acre.

2. Reproduction: Outcrossing.

3. Competition: The species occurs on sparsely vegetated slopes with a loose surface layer, and does not extend into adjacent grasslands with greater cover. At one locale pine forest is above and savannah below, neither with *P. brassicoides*. This suggests that the species prefers the less competitive sites where infiltration in the coarse soil is greater than in clay or shale sites.

4. Herbivory: The steep habitat and sparse vegetative cover is not conducive to grazing, and the slope is too steep for developed cattle trails. The species is also probably unpalatable, and no grazing by rodents or rabbits was observed.

F. Assessment and management recommendations: While there are no immediate threats, the District contains the only two small populations known in the state. Roadwork potentially affects one of the two populations. Further review of this species as a watch species by Custer National Forest is recommended.

Sphenopholis obtusata (Michx) Scribn. var. *major* (Torr.) Erdm.
Poaceae
Slender wedgegrass

A. Description

1. General description: Herbaceous annual or short-lived perennial grass, with a slender nodding spike at the top of the 0.2-1 m (7.9-39.4 in) stem. It is two-flowered and the seeds drop with the glumes. The shape and difference in width of the two glumes is distinctive, the large second being very broad at the upper end like the shape of a wedge, hence the common name. It matures in July and August.

2. Technical description: Tufted to solitary-stemmed annual or perennial, 2-9.2 (13) dm tall. Culms glabrous, hollow, erect to geniculate below. Blades rolled in the bud, flat at maturity, scabrous to pubescent, mostly 5-20 cm long, 1.5-5.7 mm wide; sheaths open, glabrous to scabrous or pubescent; ligules membranaceous, usually lacerate, 1-3 mm long; auricles lacking. Infloresence a moderately open to strongly condensed erect to nodding panicle 4-21 cm long; spikelets usually with 2 florets, the rachilla prolonged beyond the upper floret, the disarticulation ultimately below the glumes, but disarticulation of the upper floret often preceding the fall of the entire spikelet; glumes usually scabrous, unlike, the first very narrow, 1-nerved, 1-2.4 mm long, the second 3(5)-nerved, obovate, truncate to obtuse or acute-tipped, 1.5-2.9 mm long; lemmas obscurely nerved, smooth to scabrous, the lower one 1.5-2.1 mm long; palea equal to the lemma. Anthers 0.2-0.7 mm long (from Great Plains Flora Association 1986).

Figure 11.
SPHENOPHOLIS OBTUSATA VAR. MAJOR
From Cronquist et al. 1994

3. Diagnostic characteristics: The rare variety, S. obtusata var. major, has a nodding and somewhat open inflorescence in contrast to the spike-like infloresence of S. obtusata var. obtusata. It also has the second glume more than 3x as long as wide, not cucullate, lower lemma 1.9-3.1 mm (.07-.12 in) long (from Great Plains Flora Association 1986).

B. Present legal or other formal status

1. Federal

A. U. S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: Proposed watch

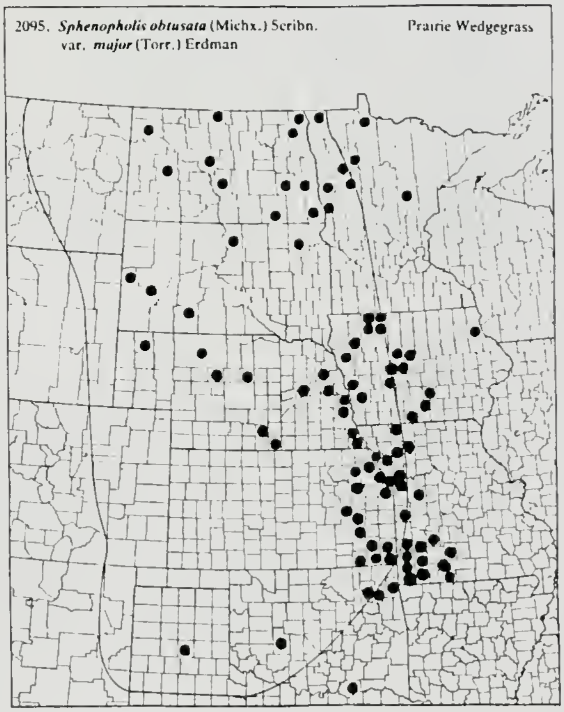
2. State: This species is currently ranked "S2" (state imperiled) based on a total of 9 records from 8 counties. It is identified as the rarer of the two varieties in the Great Plains Flora Association (1986).

C. Geographical distribution

1. Species range: Across southern Canada, throughout most of United States except extreme West.

2. Montana distribution: Widely scattered across Beaverhead, Carter, Fergus, Flathead, Gallatin, Granite, Lewis and Clark and Rosebud counties.

3. Occurrence in the study area: The one historical location on the Long Pines could not be relocated. It was not found in the South Dakota units.



2095. *Sphenopholis obtusata* (Michx.) Scribn. var. *major* (Torr.) Erdman — Prairie Wedgegrass

D. Habitat

1. Associated vegetation: Grasslands in the valleys and plains (Lesica and Shelly 1991); often in woods (Great Plains Flora Association 1986).

2. Topography: It occupies wet ground, usually along watercourses, spanning between at least 914-1524 m (3000-5000 ft).

3. Soil relationships: Soils are semi-saturated and may be temporarily inundated.

E. Population biology and biological interactions: Unavailable

F. Assessment and management recommendations: The record for the Long Pines population has been changed to potentially extirpated, whether due to the impoundment of the watercourse or to livestock use. It is reported as a decreaser (Smith 1976) and occupies primary range affected by stock. Therefore it is recommended for designation as sensitive.

Aster pauciflorus Nutt.
Asteraceae; Astereae Tribe
Marsh alkali aster

A. Description

1. General description: Perennial herb arising singly from a rhizome, often in clumps, stems branched above, 10.2-50.8 cm (4-20 in) tall. Leaves linear, up to 5.1 cm (2 in) long and less than .64 cm (1/4 in) wide, often appearing succulent to fleshy. Infloresence few-headed (usually less than 10) at ends of branches, ray flowers blue to light pink, involucral bracts glandular (from Van Bruggen 1985). Collection dates of the three Harding County records are all between July 15-30, though it apparently has indeterminate flowering and may bloom between July-September (Great Plains Flora Association 1986).

2. Technical description: Glabrous perennial 2-4(6) dm tall, arising from a creeping rhizome. Leaves cauline, linear to linear-lanceolate, the prominent ones 3-4(9) cm long and 3-45) mm wide, glabrous, entire, somewhat firm and fleshy, the uppermost reduced and bractlike. Infloresence an open, corymbiform cluster of (1)3-8 heads; involucre 4-7 mm tall, glandular; involucral bracts imbricated in 2 or 3 series, lanceolate; ray florets 15-25, ligule blue or purple to light pink, 5-7 mm long; disk florets with corolla yellowish or white. Achenes pubescent, ca 2 mm long; pappus of numerous white bristles 3-6 mm long (Great Plains Flora Association 1986).

3. Diagnostic characteristics: Marsh alkali aster superficially resembles common asters of western South Dakota in having distinct ray flowers, and narrow leaves which are not clasping. The key character, as reflected in the species epithet, is the few-flowered infloresence, with less than 10 heads vs. 20 or more for Aster ericoides , A. falcatus and A. pansus. The leaves of Marsh alkali aster have a succulent appearance, unlike all other asters. It is also highly restricted in its habitat compared these other prairie asters, being restricted to alkaline flats and extremely dry settings.

B. Present legal or other formal status

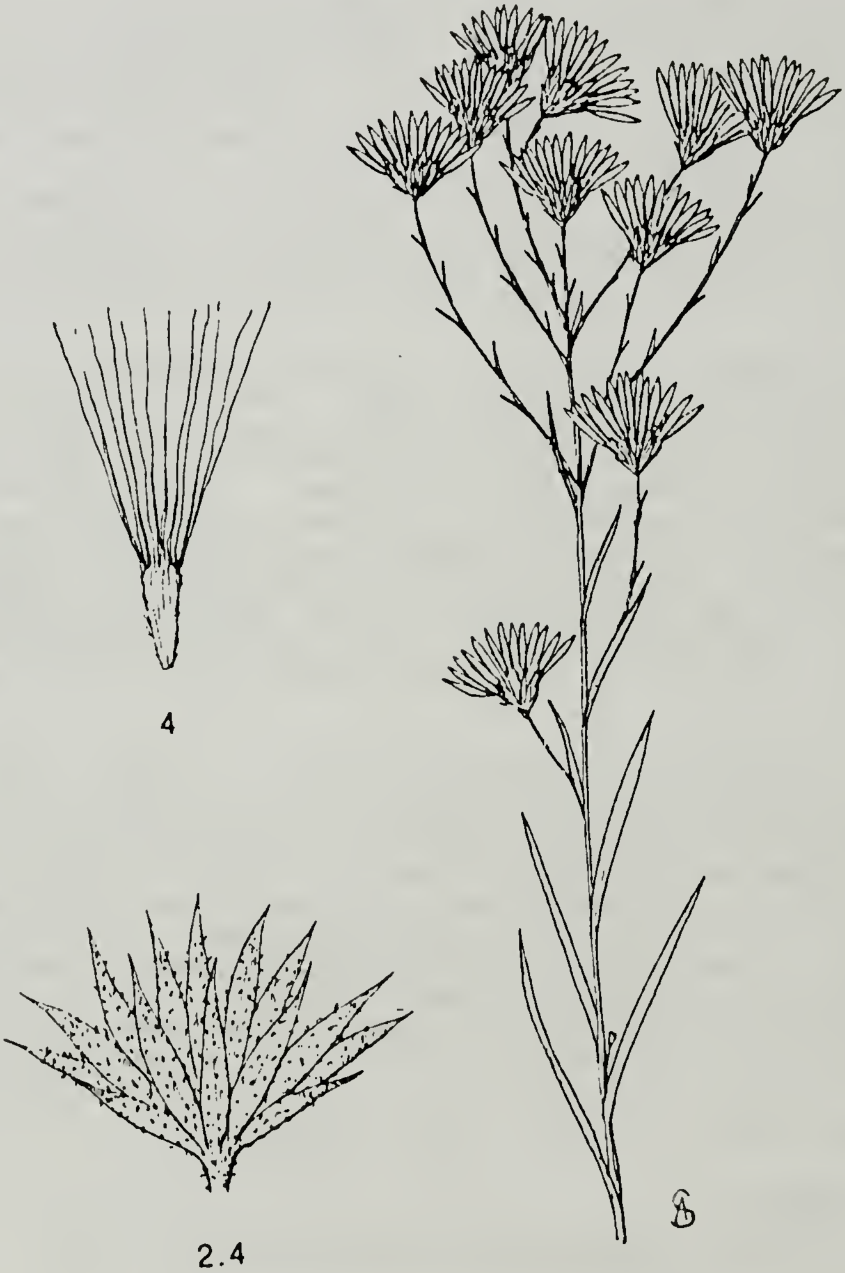
1. Federal

A. U. S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: none

Figure 12.
ASTER PAUCIFLORUS
From Cronquist et al. 1994



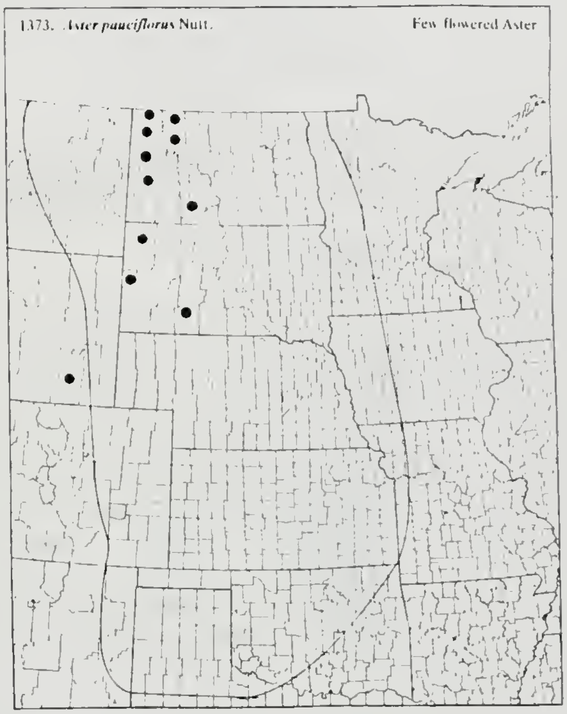
2. State: In South Dakota, the state rank is "SU" (status undetermined) based on five collection records with the most recent being in 1959.

C. Geographical distribution

1. Species range: Southern Saskatchewan to Colorado and Arizona.

2. South Dakota distribution: Western and northern South Dakota (Van Bruggen 1985).

3. Occurrence in the study area: Collected in 1959 from the South Cave Hills. Immature material was collected in the North Cave Hills which is inadequate for verification but otherwise consistent, located along Fuller Canyon in T22N R5E Sec. 10 NW 1/4 of SW 1/4, an area dominated by <u>Distichilis stricta</u> with a well-developed flora of plants adapted to alkalinity. This species is not known from Montana, though there is potential habitat at the north end of the Long Pines.



D. Habitat

1. Associated vegetation: The associated plant community is an edaphic and possibly also an early-successional community for which no associated species information is available in Harding County.

2. Topography: <u>Aster</u> <u>pauciflorus</u> may be restricted to low-lying riparian habitat in the rolling plains setting. The only Harding County record in which topographic position is indicated was from the floodplain of Box Elder Creek, an ephemeral watercourse. By late summer, these settings have no surface water, accounting for herbarium labels noting "dry soil".

3. Soil relationships: See above.

E. Population biology and biological interactions: Unavailable.

F. Assessment and management recommendations: Aster pauciflorus was not relocated. It occupies primary range where it occurs along watercourses, and its recommended status hinges on whether or not it is affected by livestock use. If it is found on Custer National Forest in the Cave Hills, and if it decreases under most or all grazing conditions, then designation as sensitive is appropriate. In the interim, it is recommended for recognition as a watch species by Custer National Forest.

Chaenactis douglasii (Hook.) H. & A.
Asteraceae; Heliantheae Tribe
Douglas' dusty maiden

A. Description

1. General description: Single-stemmed perennial herb, mostly 20.3-40.6 cm (8-16 in) tall, with little or no branching, conspicuously to weakly covered by matted white hairs (hence the reference to "dusty" in the species' common name), glandular on the upper part of the stem if at all. Leaves 1.9-12.1 cm (3/4 - 4 3/4 in) long and 1-3 times pinnately divide, appearing thick and rounded due to lower margins curled down inward. Heads 1-several in an open cluster. Ray flowers lacking, disk flowers perfect and fertile, the corollas creamy white, sometimes with shades of pink (from Hitchcock et al. 1984).

2. Technical description: Single-stemmed, taprooted perennial herb, mostly 2-5 dm tall, simple or sparingly branched, variably tomentose, sometimes glandular especially upward. Leaves 2-12 cm long and 1- to 3-pinnatifid, the thickish segments characteristically curled and so oriented that the leaves do not look flat; upper leaves usually less dissected than the larger and often tufted lower one; heads 1-several in a corymbiform, flat-topped infloresence, of the lateral branches overtopping the central axis, involucre 7-16 mm high, glandular-hairy or merely glandular; pappus scales mostly 10-16, often biseriate; receptacle naked; achenes somewhat club-shaped and angled (after Great Plains Flora Association 1986, Hitchcock et al. 1984.)

3. Diagnostic characteristics: Douglas' dusty maiden vaguely resembles false boneset (Kuhnia eupatorioides) in having rayless white flower heads. They occupy similar pioneer habitat. But Douglas' dusty maiden has dissected leaves, while false boneset has entire to slightly toothed leaves. They differ technically in that false boneset has a pappus of capillary bristles, while Douglas' dusty maiden has a pappus of scales. There are few species with which it might be confused in the study area. Our variety is C. douglasii var. achilleaefolia, the only variety that reaches the Great Plains.

Figure 13. CHAENACTIS DOUGLASII from Hitchcock et al. 1984

B. Present legal or other formal status

1. Federal

A. U. S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: none

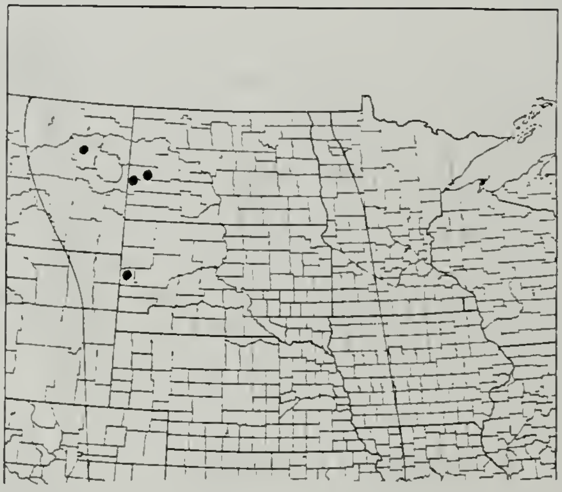
2. State: In South Dakota, this species has a state rank of "SU" (status undetermined) based two historical collections of the species in addition the new Slim Butte record.

C. Geographical distribution

1. Species range: British Columbia and California to western North and South Dakota.

2. South Dakota distribution: Known only from Harding County (Houtcooper et al. 1985).

3. Occurrence in the study area: It was collected at the northwest end of the Slim Buttes on three ridges north of Government Hill. It had previously been collected on Slim Buttes in 1941 with no futher location information.



(From Great Plains Flora Association 1977)

There is potential habitat for it at the south end of the Slim Buttes where Penstemon nitidus grows, as well as potential habitat that is invaded by yellow sweet clover (Melilotus officinalis). It had also been collected from the "Short Pine Hills" by Visher (1914) with no further location information. Potential limestone outcrop habitat is found near the East Short Pine Hills, but almost entirely outside (north) of Forest Service boundaries, an area that was not searched. In addition, this species is in all of the Montana units of the District, where it is a characteristic species on the steepest gravelly slopes.

D. Habitat

1. Associated vegetation: Douglas' dusty maiden occupies sparsely-vegetated upland slopes with Andropogon scoparius or Agropyron spicatum being most common. Associated species include low mat-forming plants like Eriogonum flavum, Hymenoxys acaulis and Astragalus vexilliflexus.

2. Topography: In the study area, this species is confined to steep upper escarpment slopes.

3. Soil relationships: Douglas' dusty maiden typically occupies droughty soils. In the study area, it is restricted to gravelly calcareous loam.

E. Population biology and biological interactions

1. Population size and condition: Population density was low and population numbers low, spread out in discrete subpopulations on three separate ridgelines. They are oriented basically downwind (southwest to northeast) of one another. The largest subpopulation is at the southwesternmost end, a core from which the sayellite subpopulations disperse. Over 75% of the population is made up of plants in rosette form. It is not known whether these are all juveniles, or whether plants which flowered in past years "regressed" under the harsh 1994 growing season conditions.

2. Reproduction: Polycarpic, the concurrent flowering making pollen exchange within the same individual likely.

3. Competition: This species does not occur in the surrounding prairie communities in which competition for water and light are high compared to its sparsely-vegetated habitat. The south flank of Slim Buttes also has potential habitat but is heavily invaded by yellow sweet clover (<u>Melilotus officinalis</u>), which alters the course of succession in its nitrogen-fixing capacity, out-competing many early-succession species.

4. Herbivory: Two individuals had the oldest flower head browsed off. This is likely to represent indiscriminate browsing early in the season, indicating low levels of herbivory.

F. Assessment and management recommendations: The <u>Chaenactis douglasii</u> is not recommended for further consideration as sensitive by the U.S. Forest Service because of few threats and its presence in distant units of the District on both sides of the state line.

Chenopodium subglabrum (Wats.) A. Nels.
Chenopodiaceae
Smooth goosefoot

A. Description

1. General description: Annual herb, with a wide range in branching forms and stature depending on site conditions, typically 7.6-20.3 cm (3-8 in) tall. Blades linear, entire, green and glabrous, with a single vein from base, up to 2.5 cm (1 in) long. Infloresence of remote, small, compact cluster of flowers (glomerules). Sepals five, glabrous, exposing a jet-black fruit at maturity; stamens five; stigmas two. Fruits containing a seed that readily detaches from the surrounding pericarp.

2. Technical description: Annual, stem solitary or branched from base, sometimes branched above, up to 8 dm tall. Blades linear, entire, to 3 cm long, with single vein from base, glabrous, exposing fruit at maturity; stamens 5; stigmas 2. Fruits horizontal, 1.2-1.6 mm in diameter, pericarp readily separable from seed (Great Plains Flora Association 1986).

3. Diagnostic characteristics: Chenopodium subglabrum sometimes occurs with and is most closely related to C. leptophyllum, a widespread species that is sometimes adventive. They both have linear, single-veined leaves but the leaves of smooth goosefoot are glabrous rather than farinose white. Smooth goosefoot typically has a highly-branched growth form with widely-spaced glomerules compared to the slender form and tight infloresence of C. leptophyllum with a single axis. They are technically distinguished by characters that require a hand lens: smooth goosefoot has a readily detachable pericarp, instead of an attached pericarp.

B. Present legal or other formal status

1. Federal

A. U. S. Fish and Wildlife Service: none. This species is imperiled in Canada (Argus and Pryer 1990). In the United States, it is possibly a Great Plains endemic, but annotation of reported specimens in the midwest and northwest is needed to clarify distribution if not taxonomy. Recent repeated collections in eastern Wyoming cast doubt the appropriateness of recommending it as a candidate for federal listing (Hartman pers. commun.).

B. U.S. Forest Service: None for South Dakota; sensitive for North Dakota.

C. Bureau of Land Management: none

Figure 14.
CHENOPODIUM SUBGLABRUM
From Gleason 1952

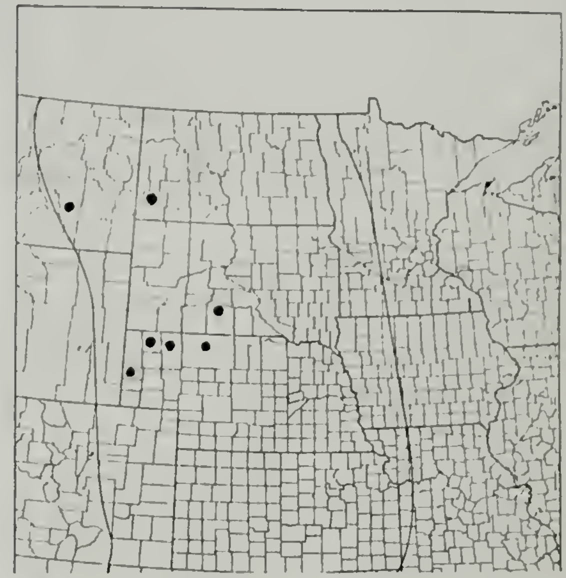
app. X1

2. State: In South Dakota, this species has a state rank of "SU" (status undetermined). The records are few while the western South Dakota potential habitat is largely unsurveyed.

C. Geographical distribution

1. Species range: Southern Manitoba to Alberta, south to Nevada, and Kansas. There are also records from Idaho, Oregon, Washington and Michigan which are in taxonomic question.

2. South Dakota distribution: Known from at least two collections in Harding County, and in southwestern South Dakota.



(From Great Plains Flora Association 1977)

3. Occurrence in the study area: Efforts to relocate the historic collections in the East Short Pines and Cave Hills were unsuccessful. The Cave Hills specimen (South Dakota State University accession no. 3177) was annotated to <u>Chenopodium</u> <u>leptophyllum</u> Nutt. ex Moq., and the East Short Pines specimen (South Dakota State University 3176) was verified. In the East Short Pines unit, the Waddell Gulch area associated with Sand Creek was surveyed extensively. Though there is loose sand habitat eroded out of sandstone, the species does not grow there and the habitat did not seem to be suitably developed. This survey did not cover the Sand Creek and North Sand Creek headwaters which do not appear to have appropriate topographic settings for either dunes or watercourse meanders [on the Moreau Peak 7.5' quad]. For this reason, it is considered unlikely to occur on the District.

It was collected elsewhere in the county on sand dunes outside of U.S. Forest Service boundaries dissimilar from any part of the District.

Note: This species is also tracked as a state species of special concern in Montana, but there is unlikely to be suitable habitat on Montana units of the Sioux District.

D. Habitat

1. Associated vegetation: Smooth goosefoot occupies early-successional, sparsely-vegetated habitat, locally devoid of legumes. The species associated with its Harding County population outside of the study area include:

Sporobolus cryptandrus
Chenopodium ambrosioides
Ambrosia acanthicarpa
Oryzopsis hymenoides
Rumex venosus
Psoralea lanceolata (the most common surrounding legume)

2. Topography: This species occurs in exposed settings where there is loose sand that has been reworked by wind or water: either upland sand dunes, or extremely sandy river terraces along a watercourse.

3. Soil relationships: The unconsolidated sandy substrate of smooth goosefoot is nutrient-poor and droughty.

E. Population biology and biological interactions

1. Population size and condition: Populations are typically small and low density. They are likely to shift population centers over time with succession.

2. Reproduction: Unknown mode of sexual reproduction.

3. Competition: Smooth goosefoot is unable to persist under continuous vegetation cover. It is absent at the Harding Co. site in microhabitat occupied by <u>Psoralea lanceolata</u>, and is potentially impacted by encroachment of <u>Melilotus officinalis</u> and <u>Euphorbia esula</u> elsewhere in its range.

4. Herbivory: While leaves of some members of the genus are noted for their high nutrient value, there is little evidence of herbivory. Its habitat in Harding County is part of a grazing allotment. There are water developments in the vicinity, and the blowouts are used to a limited extent as loafing areas.

F. Assessment and management recommendations: The Sand Creek watershed in the East Short Pines has not been completely surveyed for <u>Chenopodium subglabrum</u>. If there is well-developed sandy habitat within Forest Service boundaries, then the species warrants consideration by Custer National Forest as watch. It is otherwise unlikely to be found on the Sioux District.

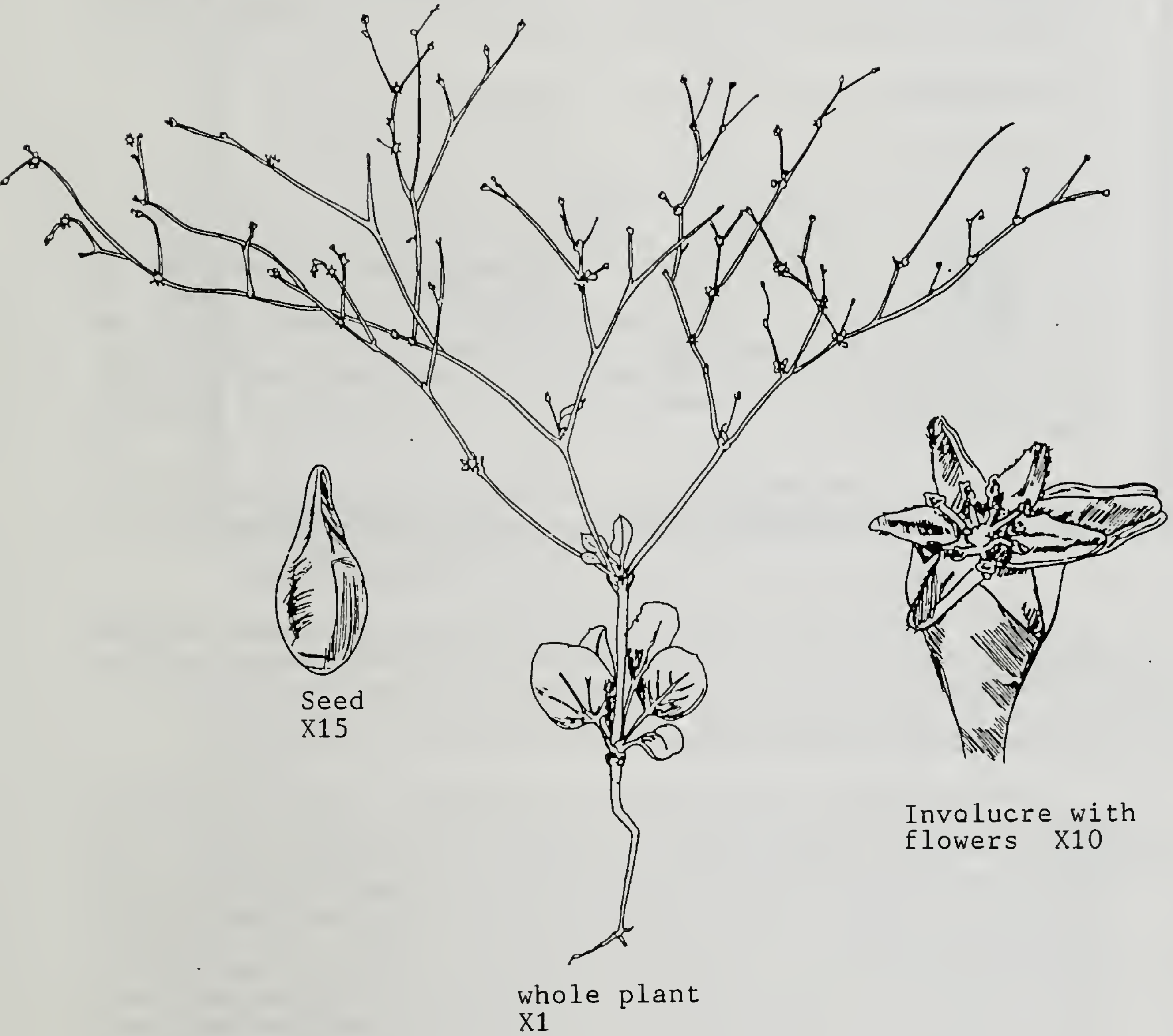
Eriogonum visheri A. Nels.
Polygonaceae
Dakota buckwheat

A. Description

1. General description: An erect, upward branching annual 5-51 cm (2-20 in) tall, arising from a slender taproot. Basal leaves are several, round, smooth, 1.3-2.5 cm (1/2-1 in) wide, petioles 2.5-3.6 cm (1 - 1 1/2 in) long. The single slender stem extends upward for 2.5-15.2 cm (1-6 in) before dividing into 2 or 3 branches, each of which continues to branch dichotomously into finer divisions of the open infloresence. A few small, oblong leaves are produced at the lower nodes. Extremely small clusters of yellowish flowers are at the node of the infloresence. Each flower produces a single dark brown seed app. 0.16 cm (1/16 in) long. The flowers appear in July and continue to be produced well into September, even after the basal leaves and stems have turned reddish brown (from Ode 1987).

2. Technical description: Erect spreading annual 1.5-3.5 dm. high arising from a slender, woody taproot; leave basal and cauline, the basal leaf-blade elliptic to rotund, 1-2.5 cm long 1-2 cm wide, glabrous and green on both surfaces, except for villous hairs along the margin and midvein, occasionally sparsely villous above when young, the margin entire and plane, the apex mostly obtuse to round, the base mostly obtuse, infrequently truncate, the petiole long, slender, 1-3 cm long, sparsely villous to pilose, the cauline leaf-blade elliptic, 0.5-1.5 cm long, 0.5-1 cm wide and similar to the basal leaves only more reduced, the petiole short, the leaves restricted to the lower nodes in the axil of the bracts; flowering stems erect, infloresences open, 0.5-3.5 dm long, di- or trichotomously branched at the lower node, dichotomous above, sparsely villous throughout, but becoming slightly less so above, bracts scale-like, ternate, triangular, 1-2.5 mm long, glabrous within and without except for ciliated margins, occasionally villous without in some, connate at the base; peduncles lacking except in the forks of the lowermost branches, these erect, slender, 0.3-1 cm long, sparsely villous; involucres turbinate, 1-1.5 mm long, glabrous within and without except for a ciliated margin, the five acute teeth 0.3-0.6 mm long, the bractlet linear-oblanceolate, 1-1.5 mm long, minutely glandular to sparsely hirsute with white marginal cells. Pedicel 1.5-2.5 mm long, glabrous. Flowers pale yellow with a slightly darker yellow to greenish-yellow or reddish-brown midrib, 1.2-1.8 mm long in anthesis, becoming 2-2.5 mm long in fruit, sparsely hispid especially along the margin and the midrib, glabrous within except for scattered minute glands at the base of the midrib. The tepals essentially simple, oblanceolate to oblong, united about 1/5 the length of the flower; stamens glabrous, the anther

Figure 15. ERIOGONUM VISHERI
From Ode 1987



Seed
X15

whole plant
X1

Involucre with
flowers X10

yellowish, 0.3-0.4 mm long, oval. Achene dark brown, shiny, 2.5-3 mm long, the large globose base tapering to a long, stout, 3-angled beak (Ode 1987; based on Reveal 1971).

3. Diagnostic characteristics: The only other sympatric annual *Eriogonum* that occurs in similar habitats as *E. visheri* is *E. gordonii* which has whitish, glabrous flowers, while those of *E. visheri* are yellowish and hispid. In addition, all of the peduncles of *E. gordonii* are peduncled while all of the involucres are sessile in *E. visheri*. Superficially, *Polygonum ramosissimum* might be mistaken for *E. visheri* because of its similar profile and because it commonly occurs in similar habitats (from Ode 1987).

B. Present legal or other formal status

1. Federal

A. U. S. Fish and Wildlife Service: Listed as a Category 2 species by the U.S. Fish and Wildlife Service (1994). This category indicates that the taxa may be appropriate for formal listing as a threatened or endangered species but that adequate information on the taxon's true endangerment status may be lacking or incomplete. A status report has been prepared for this species in South Dakota (Ode 1987) recommending Category 3C status.

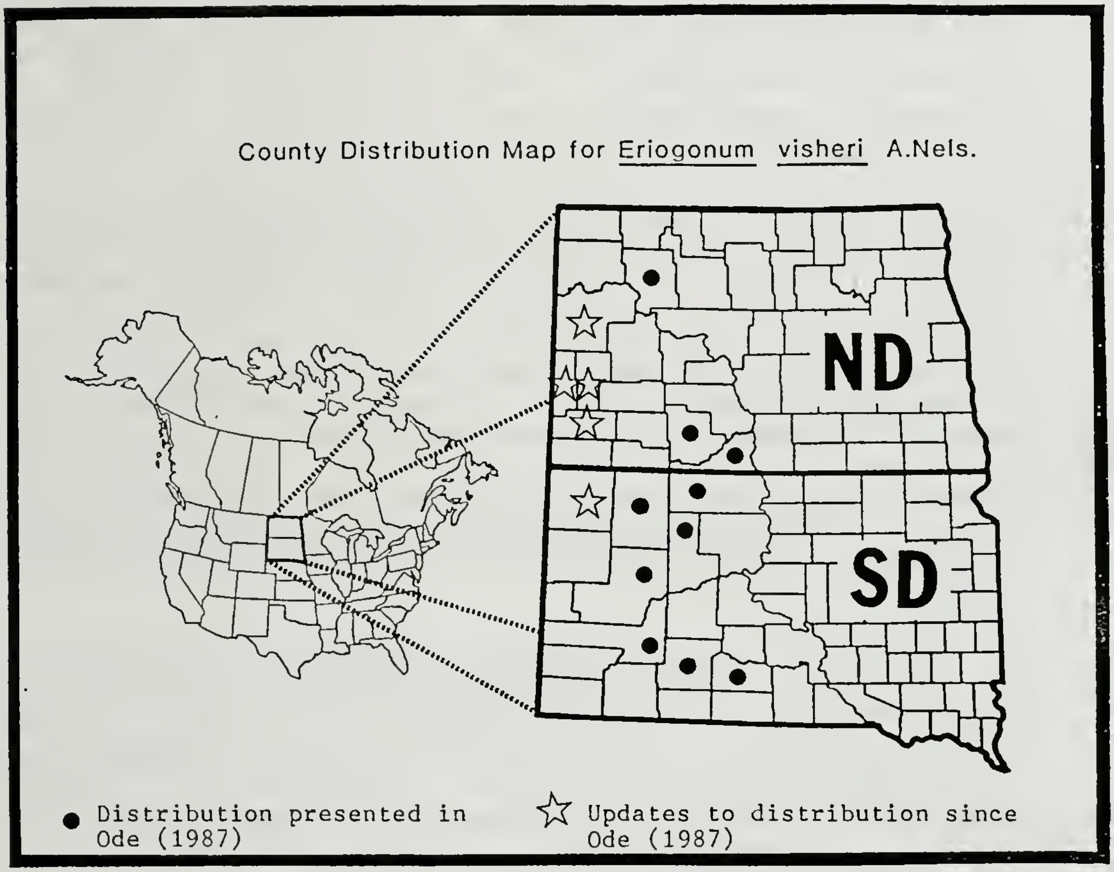
B. U.S. Forest Service: Designated as sensitive by the USDA Forest Service Region 1 (USDA Forest Service 1994).

C. Bureau of Land Management: proposed watch

2. State: In South Dakota, this regionally endemic species has a state rank of "S3," indicating that it is vulnerable (Ode 1992).

C. Geographical distribution

1. Species range: This species is endemic to North and South Dakota. It is concentrated in a six-county area of North and South Dakota (Corson, Meade, Perkins and Ziebach counties, SD; Grant and Sioux counties, ND), with populations in four additional western South Dakota counties (Harding, Pennington, Jackson and Mellette cos., SD), and five other western North Dakota counties (Billings, Golden Valley, McKenzie, Mountrail, and Slope cos.; Ode 1987, North Dakota Natural Heritage Inventory 1993, Vanderpool 1993, North Dakota Natural Heritage Inventory data, South Dakota Natural Heritage Program data). The next page shows its distribution as mapped seven years ago (Ode 1987), with new county records that have been added since.



Modified from Ode (1987)

2. South Dakota distribution: The eight-county distribution in South Dakota is associated with the Badlands settings in the Grand River and the Moreau River drainages of northwestern South Dakota, and the "Badlands Wall" in south-central South Dakota.

3. Occurrence in the study area: The Sioux District occurrence is at the southern end of the Slim Buttes, representing a new county record in South Dakota and a minor range extension.

There are no records of this species from Montana, though there are occurrences in North Dakota within five miles of the state line.

D. Habitat

1. Associated vegetation: *Eriogonum visheri* occupies sparsely vegetated settings. At Slim Buttes, these are either dominated by *Distichilis stricta*, or lacking distinct community development. Other associated species include: *Eriogonum pauciflorum*, *Atriplex dioica*, *Iva axiliaris*, *Macheranthera canescens* and *Salsola kali*.

2. Topography: *Eriogonum visheri* grows on sedimentary rock outcrops that form Badlands topography or localized Badlands features. The settings are barren and highly erodible, most often centered on the outcrop slopes, but also extending into outwash flats. At Slim Buttes, these are localized outcrops of the Hell Creek Formation, one of the few on the District, where two ephemeral streams converge in erodible shale to form a miniature area of Badlands outcrops.

Almost all of the remains of the previous year's plants were upslope from plants of the current season, indicating a population shift downward in topographic position under the heavy rains of 1993.

3. Soil relationships: The Slim Butte population is in the largest local area mapped as Cabbart - Rock Outcrop complex (Johnson 1988). The population occurs mainly on substrate which is classified as Badlands outcrop rather than soil, including shale and bentonite. It extends onto outwash flats that have sandy alluvium mixed in with local parent material.

E. Population biology and biological interactions

1. Population size and condition: An estimated 1000 plants made up the Slim Buttes population, within a Badlands area covering less than 5 acres. Most plants of the population were in low density. In one area of upland "pockets", plant densities exceeded 100 plants per square meter, perhaps representing a seed cache that had germinated.

2. Reproduction: Protandrous, wind-pollinated, and self fertile (Ode 1987).

3. Competition: Potential competitors of *Eriogonum visheri* include Russian thistle (*Salsola kali*) and Kochia (*Kochia scoparia*), which occupy the same habitat and can grow at high enough densities to crowd it out. In addition, Yellow sweetclover (*Melilotus officinalis*) can contribute to a successional shift which favors these competitors. It is abundant on the south-facing slopes of Slim Buttes above the plains setting, and has the potential to invade the population setting.

4. Herbivory: Wind, water, and gravity are downslope dispersal vectors. Long-term retention of the *Eriogonum visheri* population mosaic pattern across the landscape may be linked to animal dispersal vectors, including passerine birds and least chipmunks, as suggested by Ode (1987).

F. Assessment and management recommendations: Dakota buckwheat is a sensitive species on Custer National Forest now known from the Sioux District. Water developments for livestock are discouraged in the vicinity. Consultation with the Custer National Forest - Cedar District and the South Dakota Natural Heritage Program is necessary to determine how this site fits into monitoring and protection plans.

The Slim Buttes population shifted downslope under heavy rains and Badlands slope erosion in 1993. A relatively high proportion are in sandy outwash flats where they are subject to occasional livestock trampling and competition with more mesic species. Grazing has limited direct impact, but heavy grazing favors exotic plants which may compete with *Eriogonum visheri*.

Festuca idahoenis Elmer
Poaceae
Idaho fescue

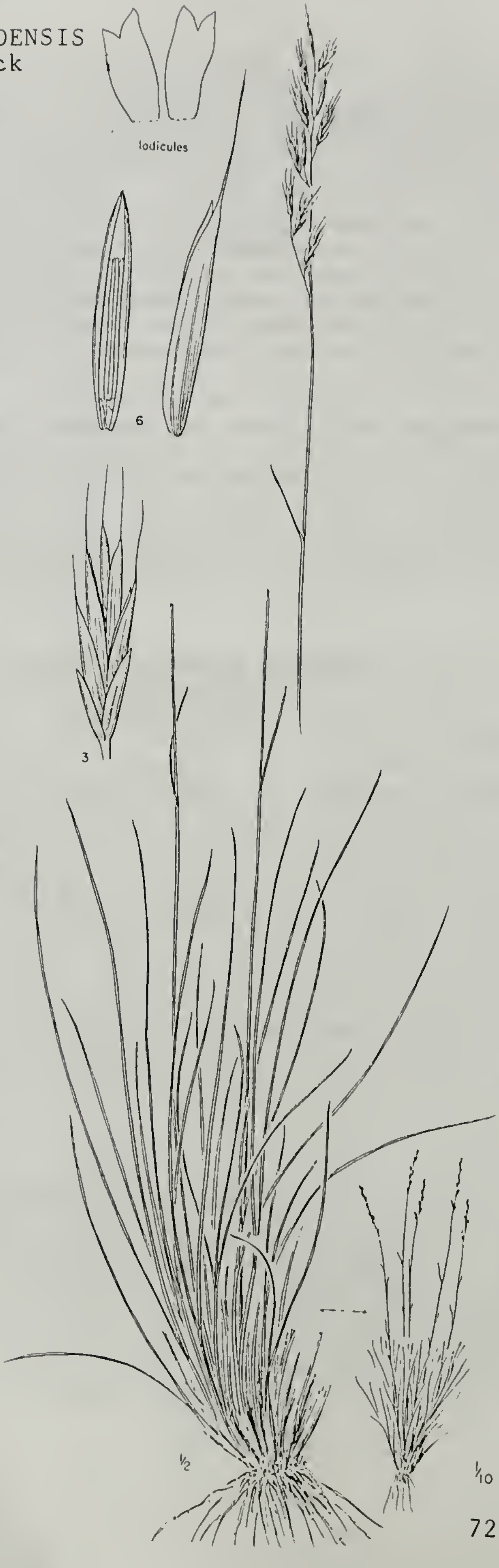
A. Description

1. General description: Herbaceous perennial bunchgrass, 30-100 cm (11.8-39.3 in) tall; with inrolled leaf blades, short ligules less than 2 mm (.08 in), awned lemmas with awns shorter than the length of the body, elongate blades over half the length of the culm; panicle somewhat open, and usually over 10 cm (4 in) long (from Hitchcock 1971).

2. Technical description: Culms usually densely tufted in large bunches, 30-100 cm tall,; blades numerous, usually elongate, very scabrous, rarely smooth, filiform, involute; panicle narrow, 10-20 cm long, the branches ascending or appressed, somewhat spreading in anthesis; spikelets mostly 5- to 7-flowered; lemmas nearly terete, about 7 mm long; awn usually 2 to 4 mm long.

3. Diagnostic characteristics: *Festuca idahoensis* differs from *F. ovina* in panicle length, plant height, and leaf blade length. *Festuca idahoenis* is relatively larger in all respects, with panicle length 10-20 cm (4-7.9 in) vs. mostly less than 10 cm; plant height 30-100 cm (11.8-39.3 in) tall vs. mostly less than 30 cm tall; and leaf blades elongate and over half as long as the culms, vs. blades mostly less than half as long as the culms. It also has lemmas about 7 mm (.3 in) long, vs. 4-5 mm (.16-.2 in) long (from Hitchcock 1971).

Figure 16.
FESTUCA IDAHOENSIS
From Hitchcock
et al. 1984



Our variety is _F_. _idahoensis_ var. _idahoensis_, the only variety that reaches the Great Plains.

B. Present legal or other formal status

1. Federal

A. U. S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

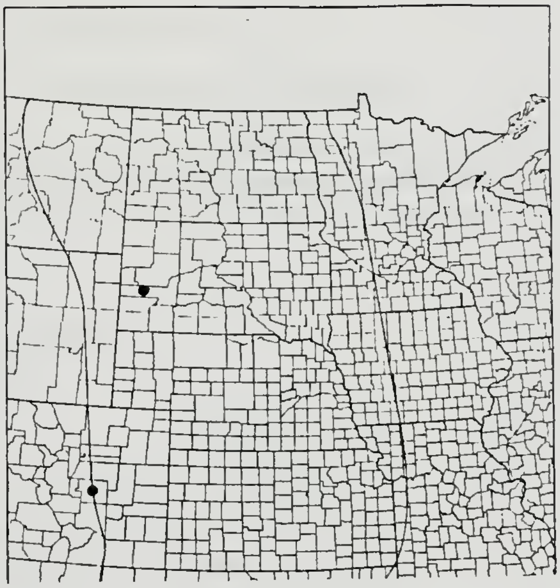
C. Bureau of Land Management: none

2. State: In South Dakota, the state rank is "SU" (status undetermined) based on a single record, without voucher specimen documentation.

C. Geographical distribution

1. Species range: British Columbia to Alberta, Colorado and California.

2. South Dakota distribution: This species is present in the Black Hills, but there is evidence that it has been seeded there (Ode pers. commun.). The only record for this species growing in the wild in South Dakota is the Harding County record from the study area, which had not been documented by a voucher. The authors did not revisit the isolated butte summit where it was reported but did find _Festuca_ _ovina_ in similar Cave Hills habitat; there is a remote possibility that the plant in this record was misidentified. Species status is unresolved until such time as collections of fescues are made on the isolated butte in the Davis Draw area of the North Cave Hills.



(From Great Plains Flora Association 1977)

3. Occurrence in the study area: Reported from the North Cave Hills. It was not found in the Montana units of the District, though it is known elsewhere throughout most of Montana.

D. Habitat

1. Associated vegetation: The associated species noted with _Festuca idahoensis_ include an unusual combination of the following:

Andropogon gerardi
Pinus ponderosa
Poa sandbergii
Agropyron spicatum
Agropyron smithii
Stipa viridula
Prunus virginiana

2. Topography: Sandstone butte top of less than 10 acres surrounded by sheer slopes precluding cattle access and restricting livestock access.

3. Soil relationships: Sandy and extremely droughty.

E. Population demography and biology: Unavailable.

F. Assessment and management recommendations: A documenting voucher specimen and site-specific information are warranted. No Forest Service status is recommended at this time.

Gentiana affinis Griseb.
Gentianaceae
Northern gentian

A. Description

1. General description: Herbaceous perennial, 1-3.5 dm (3.9-13.8 in) tall, with leaves 1-3.5 cm (.4-1.4 in) long. The open, blue-purple corolla is less than 3 cm (1.2 in) long, and arranged in an infloresence of clusters at upper leaf axils (from Great Plains Flora Association 1986).

2. Technical description: Glabrous perennial, 1-3.5 dm tall, internodes 0.5-4.5 cm long. Leaves lance-ovate to lanceolate, 1-3.5 cm long, 0.3-1.5 cm wide. Inflorescence of several flowers arranged in racemose to capitate clusters in axils of upper leaves. Calyx 7-15 long, tube 4-7 mm long, lobes narrowly linear (less than 1 mm wide), obsolete to 7 mm long; corolla blue-purple, narrowly funnelform, open, 2-3 cm long; lobes ovate, acute, extending beyond summit of plaits; lobes of plaits acute (Great Plains Flora Association 1986).

3. Diagnostic characteristics: There are no other species of gentians known from the Harding County, although _Gentianella amarella_ is widespread among the units of the District. As a

Figure 17. GENTIANA AFFINIS
From Hitchcock et al. 1984

gentian, Gentiana affinis has plicate fringes between the lobes of the corolla compared to Gentianella amarella which has no fringes. It also has a larger flower of 2-3 cm (.79-1.2 in) vs. 0.8-1.5 cm (.31-.59 in); and a deep blue-purple flower color vs. a pale blue, white, or greenish color.

B. Present legal or other formal status

1. Federal

A. U. S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: none

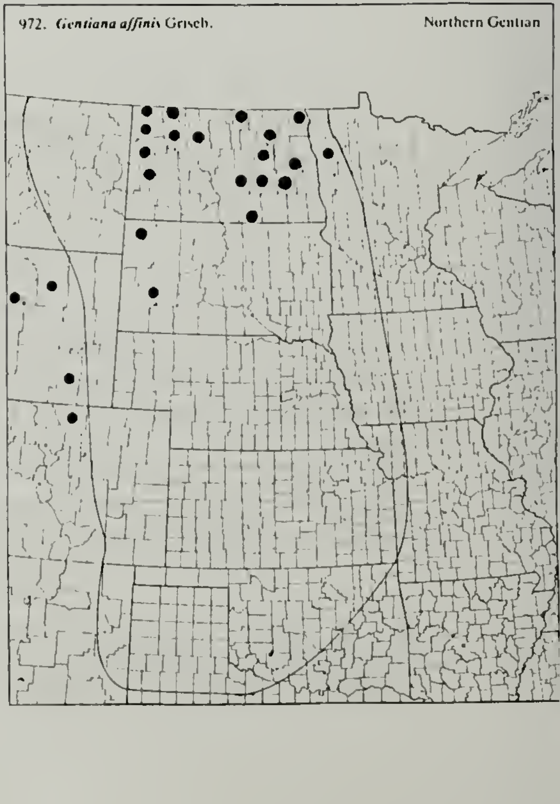
2. State: In South Dakota, the state rank is "S2" (imperiled) based on 6-20 widely scattered records.

C. Geographical distribution

1. Species range: British Columbia to Saskatchewan, south to California, western South Dakota and along mountains to Colorado and Arizona.

2. South Dakota distribution: Black Hills and northern South Dakota (Houtcooper et al. 1985). This area represents the southeastern edge of the range for the species.

3. Occurrence in the study area: Northern gentian was collected in 1910 from "Cave Hills". It is likely that the North Cave Hills has more suitable habitat, but there is no indication whether the collection was from the North or South Cave Hills.



972. *Gentiana affinis* Griseb. Northern Gentian

It is not known from the Montana side of the District or eastern Montana in general, though it does occur in western and central Montana (Dorn 1984).

D. Habitat

1. Associated vegetation: The historical collection from the area did not include information on associated

vegetation. Its habitat is described as "wet meadows, shores, springs, seepage area and low prairie" (Larson 1993), indicating that it could be found in productive grasslands, in full or partial sun.

2. Topography: The setting of the historical collection was described as "brooks", suggesting a small, spring-fed, freshwater stream setting. Spring-fed streams in both the North and South Cave Hills were extensively surveyed, most of these associated with hardwood draws. The Gentianella amarella was locally abundant in moist headwater areas at the north end of North Cave Hills, but there were no other species found in the Gentian Family.

3. Soil relationships: Soils are most likely loamy and remain moist for most or all of the growing season.

E. Population biology and biological interactions:

1. Population size and condition: Gentiana affinis was noted as abundant in 1910. It is likely to have undergone decline if not extirpation since then, since no plants could be found.

2. Reproduction: Outcrossing

3. Competition: Unknown

4. Herbivory: This species occupies primary range in settings which are favored for livestock grazing, watering, and shelter.

F. Assessment and management recommendations: The apparent decline of this species, and the concentrated use of its Cave Hills habitat by livestock form the basis for recommending that it be considered as sensitive. It was not found in the Montana units of the District.

Haplopappus armerioides (Nutt.) A. Gray
Asteraceae
Skyline goldenweed

A. Description

1. General description: Herbaceous perennial with closely tufted basal leaves and leafless flowering stalks, arising from a much-branched woody caudex. Leaves narrowly oblanceolate-acuminate, usually 2-8 cm (0.8-3.1 in) long and 3-10 mm (.12-3.9 in) wide, entire. Infloresence usually a singe head, ray flowers and disk flowers yellow. Achene pappus made up of soft bristles (from Great Plains Flora Association 1986). Flowering from late May through June. All 1994 fieldwork results were based on records of plants that weres past flowering, most of which had infloresences that had shed all seeds by early July.

2. Technical description: Cespitose subshrub, 5-15 cm tall, essentially glabrous. Stems numerous, arising from a much-branched, stout woody caudex, surmounting a prominent taproot. Leaves persistent mostly basal, sessile, narrowly oblanceolate-acuminate, 2-8(10) cm long and 3-10 mm wide, entire; margins sometimes scabrous,or often resinous, cauline leaves few and reduced. Inflorescences usually a single head on a subscapose peduncle, or sometimes with 2-3(5) heads; involucre broadly campanulate, 10-12 mm tall and about as wide; involucral bracts imbricate in 3 or 4 series, obtuse to acuminate, with a conspicuous greenish region on the distal 1/3-1.4; ray florets (8)10-12(15), ligule 10-12 mm long, yellow; disk florets ca 40, corolla +/- 5 mm long, yellow. Achenes 4-5 mm long, somewhat flattened, villous; pappus of numerous soft, white bristles, 5 mm long (Great Plains Flora Association 1986).

3. Diagnostic characteristics: This is one of several acaulescent tufted composites in western South Dakota, and can be identified in vegetative condition. It superficially resembles *Hymenoxys acaulis* with which it occurs, although the latter has hairy rather than glabrous leaves. Its entire leaves and acaulescent growth form distinguish it from other species of the genus in the study area.

B. Present legal or other formal status

1. Federal

A. U. S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: none

Figure 18.
HAPLOPAPPUS ARMERIOIDES
From Hitchcock et al. 1984

app. X1

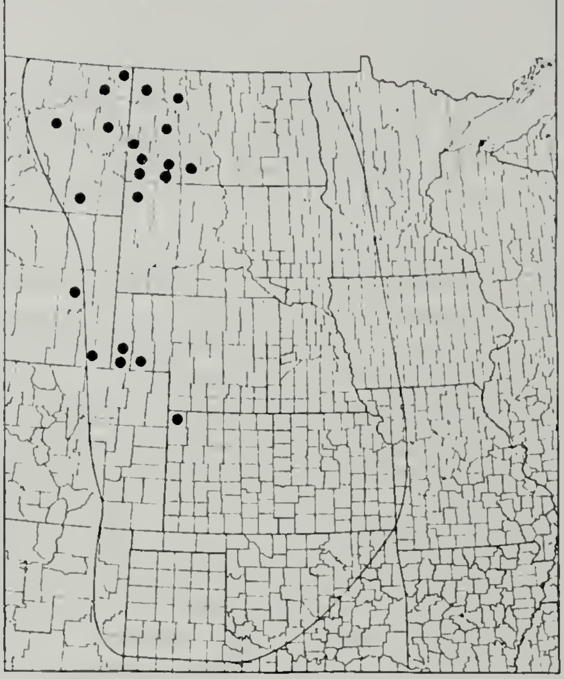
2. State: In South Dakota, this species had a state rank of "SU" (status undetermined) based on limited information, but the 1994 field data provides the basis for assigning it a state rank of S4 (potentially secure).

C. Geographical distribution

1. Species range: Western North Dakota to Montana, Arizona and northwestern Kansas.

2. South Dakota distribution: This species has only been collected in Butte and Harding counties in northwestern South Dakota (Houtcooper et al. 1985).

3. Occurrence in the study area: This species was found throughout the South Dakota units at a total of ten locations (including seven new populations and numerous subpopulations) across the Slim Buttes, North and South Cave Hills. It also occurs throughout the Montana units of the District.



1495. *Haplopappus armerioides* (Nutt.) Gray

D. Habitat

1. Associated vegetation: The <u>Haplopappus armerioides</u> is found at early successional stages of communities dominated by <u>Stipa comata</u> - <u>Carex filifolia</u>, either at topographic breaks or extremely exposed settings wanting in soil development. On calcareous substrates, it is part of a discrete disclimax community with the most abundant species including some combination of <u>Eriogonum pauciflorum</u>, <u>Astragalus vexilliflexus</u>, and <u>Artemisia longifolia</u>. Associated species in the study area are listed below:

Artemisia campestris
Artemisia longifolia
Astragalus gilviflorus
Astragalus vexilliflexus
Bouteloua gracilis
Calylophus serrulatus
Carex filifolia
Chamaerhodos erecta
Chrysothamnus nauseosus

Commandra umbellata
Cryptantha celosioides
Cryptantha torreyana
Eriogonum pauciflorum
Gutierrezia sarothrae
Hymenoxys acaulis
Muhlenbergia cuspidata
Opuntia polyacantha
Stipa comata

2. Topography: This species occurs at a variety of upland settings that include the borders between upland grassland and table top grassland or rimrock and rockland. It is most frequently found at the crest of ridge breaks but is also found on thin soil flat ridge tops and balds, and on lower sparsely-vegetated erodible calcareous slopes.

3. Soil relationships: Population sites had a wide range of soil textures from claypan to thinsoil sands.

E. Population biology and biological interactions

1. Population size and condition: Population numbers were estimated based on the number of clumps separated by a distance of over app. 5 cm, assuming that anything farther apart is more likely to be a separate individual rather than a belowground branch off of the same plant. In sloping settings, representing the majority of population sites, individual plants were unmistakably discrete. Population size estimates ranged from 50 to 1000+ plants (two populations).

2. Reproduction: This long-lived perennial can persist for many years and spread via vegetative reproduction. It occupies settings that are eventually encroached by climax vegetation or else eroded away, so it depends on seed production for recruitment and persistence on the landscape.

3. Competition: The settings and species associations of Haplopappus armerioides strongly suggest that this species cannot compete in the prevailing table top grassland and upland grassland settings but is primarily restricted to topoedaphic ecotones.

4. Herbivory: This species occupies secondary range at most population sites and showed no evidence of grazing or browsing.

F. Assessment and management recommendations: The high number of large populations and their limited sensitivity to disturbance provide the basis for recommending that Haplopappus armerioides be excluded from further consideration by the U.S. Forest Service and the South Dakota Natural Heritage Program.

Mertensia ciliata (James ex Torrey) G. Don
Boraginaceae
Mountain bluebells

A. Description

1. General description: Herbaceous perennial, 4-15 dm (15.7-59 in) tall and robust, with multiple stems from a woody caudex. The leaves are up to 15 cm (5.9 in) long, and with evident laterial veins on the stem leaves. The blue corolla is 5-parted, with a distinct tube and slightly flared limb, the total corolla length is usually 1-1.5 cm (.4-.59 in) long (from Hitchcock et al. 1984, Great Plains Flora Association 1986).

2. Technical description: Stems numerous from a branched, woody caudex, 4-15 dm tall; herbage glabrous, or the leaves often strigose, especially beneath; leaves more or less evidently veined, the basal ones petiolate; cauline leaves well developed and only gradually reduced upward, the blade narrowly elliptic or lance-elliptic to rather narrowly ovate, 3-15 cm long, 1-5 cm wide,, generally tapering to the base, or the lower sometimes more rounded, only the lower evidently petiolate; inflorescence branched and open in well-developed plants; calyx 1-3 mm long, cleft nearly or mostly 0.8-1-2(1.5) times as long as the tube, the tube with, or more often without, a fringe of hairs and conspicuous, 1.5-3 mm long; anthers 1.2-2.2 mm log, typically a little under 2 mm.; styles elongate, often shortly exserted from the corolla (from Hitchcock et al. 1984).

3. Diagnostic characteristics: Mertensia ciliata is a much taller plant than M. lanceolata and M. oblongifolia, the other two species of bluebells in the area, growing 4-15 dm (15.7-59 in) at maturity vs. less than 4 dm. It has distinctly veined stem leaves vs. no prominent lateral veins (from Van Bruggen 1985).

B. Present legal or other formal status

1. Federal

A. U. S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: none

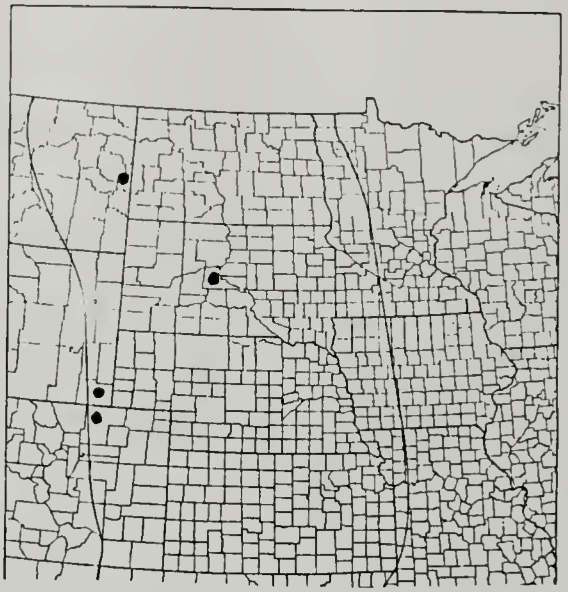
2. State: In South Dakota, the state rank is "S1" (critically imperiled) because there are fewer than five records and efforts to relocate some of these were unsuccessful.

Figure 19. MERTENSIA CILIATA
From Hitchcock et al. 1984

C. Geographical distribution

1. Species range: Mountain bluebells is common in the Rocky Mountains and is also found in the Great Basin and the Sierras (Hitchcock et al. 1984). The range of this species barely enters the Great Plains, where it is known from at least Stanley County, SD, Wibaux County, MT, Laramie County, WY and Weld County, CO (Great Plains Flora Association 1977) at the eastern limits of its range.

2. South Dakota distribution: Rare in western South Dakota (Van Bruggen 1985).



(From Great Plains Flora Association 1977)

3. Occurrence in the study area: This species was recently documented from the Teepee Canyon of Slim Buttes. It had been collected in 1912 in the West Short Pines, a unit which was not visited in the study. It is not known whether the original West Short Pines collection was made within present-day Forest Service boundaries. This species was not found on the Montana units of the District.

D. Habitat

1. Associated vegetation: The Slim Buttes population was documented from a steep forested slope of Pinus ponderosa. Information on the associated West Short Pines site is unavailable. Van Bruggen (1985) characterizes its habitat as "damp thickets." The associated species at Slim Butte were:

Cystopteris fragilis
Elymus villosus
Fraxinus pensylvanica
Galium boreale
Pinus ponderosa
Prunus virginiana

2. Topography: This species as it occurs in the Great Plains occupies valley bottom settings associated with springs, seeps, and spring-fed watercourses. Its Slim Butte population is located on the lower slope of a steep north facing slope in Teepee Canyon.

3. Soil relationships: Semi-saturated or mesic.

E. Population biology and biological interactions

1. Population biology and biological interactions: This species was not relocated during reconnaissance survey in the Teepee Canyon area in the NE 1/4 of Sec. 31. It is presumed to be extant because the original survey is recent (1986). The spring vicinity is heavily infested with Cirsium arvense and Phalaris arundinaceae. That infestation is spotty upstream. Excavation work to maintain or enhance the spring for livestock use had taken place within the past few years. Recent flash flood conditions within the previous two weeks had plastered the vigorous emergent vegetation in the watercourse, but did not breach the highwater mark above which Mertensia ciliata is presumed to be located.

2. Reproduction: Unknown

3. Competition: Unknown

4. Herbivory: Unknown

F. Assessment and management recommendations: The highly-restricted distribution of this species and potential vulnerability to surrounding land use provide the basis for recommending that this species be considered sensitive in the District.

Penstemon nitidus Dougl. ex Benth.
Scrophulariaceae
Shining penstemon

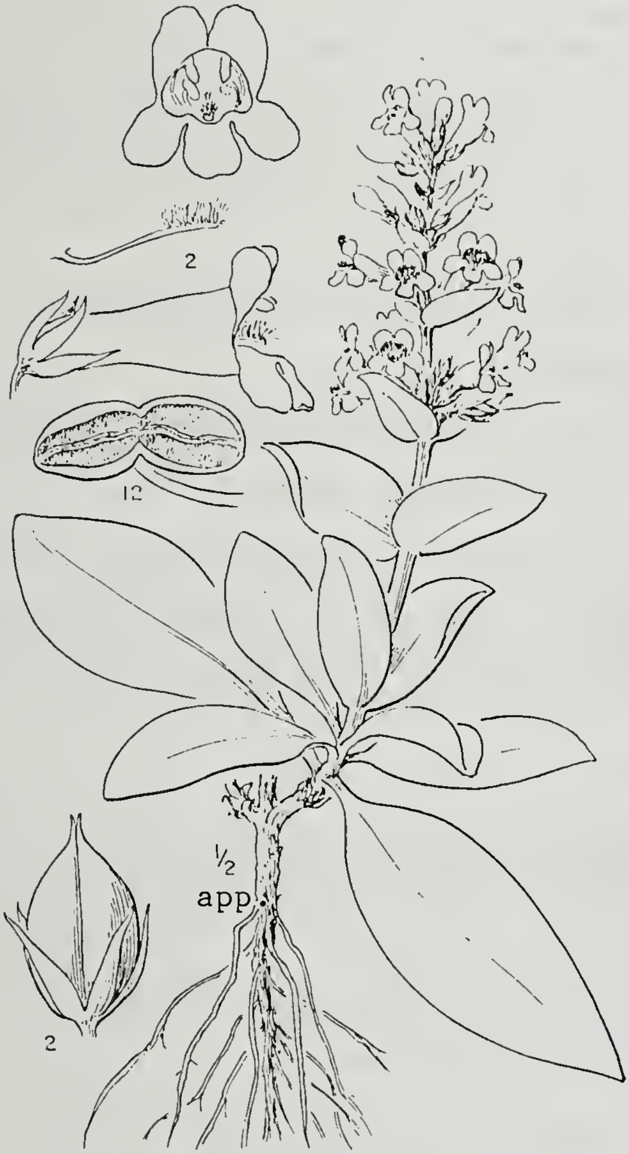
A. Description

1. General description: Herbaceous perennial arising from a woody crown, with distinctly firm, glaucous leaves that lend it the common name of "shining" penstemon. The stem leaves are clasping and often have a mucronate point. The flowers have glabrous anthers and a corolla which is glabrous externally, making up an infloresence in a tight compound cluster. The sepals are usually less than 7 mm (.28 in) long (from Great Plains Flora Association 1986).

2. Technical description: Herbaceous perennial; stems erect or assurgent, (0.5)1-3.5(4) dm tall, glabrous and glaucous, 1-7 stems arising from a thick crown or short-branched woody caudex surmounting a taproot. Leaves entire, thick, firm, glabrous and often heavily glaucous; basal leaves linear-lanceolate to oblanceolate or spatulate, 1.5-10 cm long overall, 0.2-2.7 wide, acute or ovate or frequently mucronate, often tufted and reddish, petiolate, the petioles occasionally winged; cauline leaves lanceolate to lance-ovate below, lance-ovate to ovate above, (1.1)1.8-8.5 cm long, (0.3)0.5-2.8(3.2) cm wide, acuminate to acute or frequently mucronate, clasping to cordate-clasping. Thryse (2)5-17 cm long, with (2_4-10 verticillasters, compact to elongate, scarcely to distinctly interrupted, cauline leaves below, much reduced above, acuminate to acute, bases clasping to cordate-clasping. Calyx glabrous and somewhat glaucous, lobes lanceolate to lance-ovate, 3-8 mm long, 1-3 mm wide, acuminate, margins narrowly scarious towards the base, entire to slightly erose; corolla (10)13-15(18) mm long, tubular salverform, bilabiate, deep blue or rarely pink, glabrous externally, throat 4-6 mm broad, moderately ampliate, lined internally on the anterior and posterior surfaces with violet or purple guidelines, lobes of the upper lip eglandular hairs; staminode reaching the orifice or slightly exserted, flattened distally and recurved, densely bearded at the tip with golden-yellow hairs to 1.5 mm long, more sparingly bearded away from the tip for 1.3-1.2 its length; anther sacs 0.7-1.2 mm long, externally minutely papillose, particularly along the sutures, divergent, dehiscing nearly to the apices and across the connective, note becoming explanate; style glabrous (Great Plains Flora Association 1986).

3. Diagnostic characteristics: The clasping stem leaves distinguish _P. nitidus_ from _P. angustifolius_ which it most closely resembles. In addition, the leaves of _P. nitidus_ are lanceolate to ovate, acuminate or more frequently mucronate vs. linear to lanceolate or lance-ovate, short to long acuminate or acute. The anther sacs of _P. nitidus_ are also

Figure 20. PENSTEMON NITIDUS
From Hitchcock et al. 1984



relatively small at 0.7-1.2 mm (.03-.05 in) long vs. 1.1-1.5 mm (.04-.06 in) long (from Great Plains Flora Association 1986).

Penstemon nitidus is closely allied with and has a more western distribution than *P. angustifolius*. It has been suggested that where the ranges of these two species overlap in eastern Montana, western South Dakota and western North Dakota, "monographic treatment will necessitate the treatment of these several taxa as geographic races of a single species, under the binomial *P. angustifolius* Pursh" (Hitchcock et al. 1984). More extensive collecting in this range of overlap, and review of materials by FNA author Noel Holmgren is recommended.

B. Present legal or other formal status

1. Federal

A. U. S. Fish and Wildlife Service: none

B. U.S. Forest Service: none

C. Bureau of Land Management: none

2. State: In South Dakota, the state rank for Shiny penstemon is "SU" (status undetermined) based on three collection records prior to the two new Slim Butte records; and the incompleteness of survey work in its habitat.

C. Geographical distribution

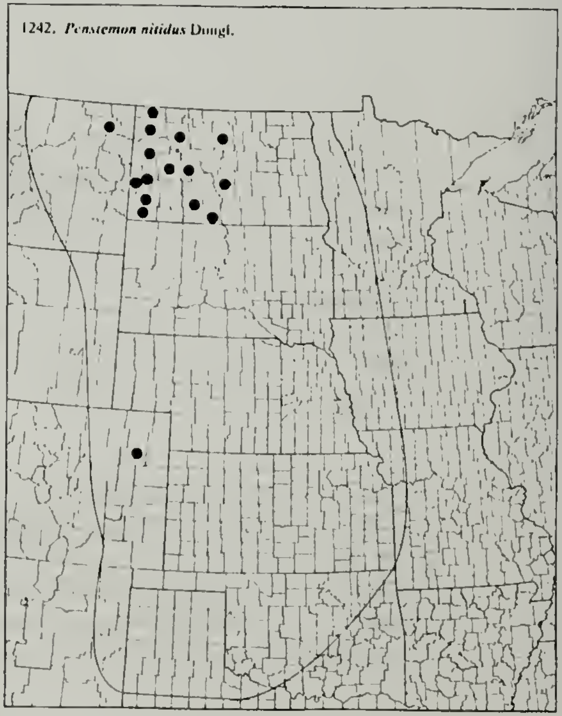
1. Species range: Southern Manitoba to British Columbia, Wyoming and northwestern South Dakota.

2. South Dakota distribution: This species is restricted to northwestern South Dakota.

3. Occurrence in the study area: This species has been documented from opposite ends of the Slim Buttes, and from the Chalk Buttes.

D. Habitat

1. Associated vegetation: The plant community is an early successional phase of



calcareous upland grassland, on both south-facing slopes with Andropogon scoparius, Artemisia cana and Rhus trilobata; as well as on slopes with Stipa comata and Juniperus horizontalis. The list of associated species includes:

Andropogon scoparius
Artemisia cana
Carex filifolia
Juniperus horizontalis
Mentzelia dispersa
Phacelia hastata
Senecio canus
Stipa comata

2. Topography: Steep slopes at or near butte perimeter, most often found on exposed southwest aspect.

3. Soil relationships: Soil textures include mostly cobbles and silts, from calcareous parent material. They have good water-retaining capacity in spite of the exposed setting.

E. Population biology and biological interactions

1. Population size and condition: The Government Hill population and subpopulations includes several hundred plants. The new subpopulations found during 1994 fieldwork north of Government Hill appear to be waifs downwind from the core population.

2. Reproduction: Outcrossing.

3. Competition: This species does not occur in the surrounding prairie communities in which competition for water and light are high compared to its sparsely-vegetated habitat. The south flank of Slim Buttes also has potential habitat but is heavily invaded by yellow sweet clover (Melilotus officinalis), which alters the course of succession in its nitrogen-fixing capacity, out-competing many early-succession species.

4. Herbivory: There is infrequent browsing; two inflorescences had been almost completely browsed off.

F. Assessment and management recommendations: This species is not recommended for further consideration by the U.S. Forest Service because of few threats, and its presence in distant units of the District on both sides of the state line.

DISCUSSION

Recommendations concerning U.S. Forest Service sensitive species designation are based on the following Region 1 criteria: rangewide abundance, distribution within the Region, degree of threat or habitat loss, ecological amplitude, and downward trend (USDA Forest Service Region 1 ranking guidelines, no date). We considered only those species whose presence on the district has prospective conservation significance, ruling out those rare Montana species which are present in the South Dakota units of the District, and those rare South Dakota species which are present in the Montana units.

Based on the above critera, we are recommending four Sioux District species for sensitive status, in addition to Eriogonum visheri which is already designated sensitive as known from other Custer National Forest districts. The four species include:

Asclepias ovalifolia
Gentiana affinis
Mertensia ciliata
Sphenopholis obtusata var. major

Five Sioux District species are recommended for watch status:

Aster pauciflorus
Carex torreyi
Chenopodium subglabrum
Phlox andicola
Physaria brassicoides

Watch status species represent taxa for which there is preliminary but incomplete information available to make a recommendation for designation as sensitive; recognition of watch species is at the discretion of Custer National Forest. The remaining nine species of state concern on the District do not warrant special U.S. Forest Service consideration.

The majority of the species targets in this study are peripheral. Eight of the original target species are regional endemics or otherwise restricted and possibly vulnerable rangewide; two of these are now documented on the District (asterisked in the following list): Astragalus barrii, Astragalus pauciflorus, Ceanothus herbaceus, Chenopodium subglabrum, Eriogonum visheri*,Lomatium nuttallii, Physaria brassicoides*, Psoralea hypogaea. Conservation of rare Great Plains species warrants the special attention of land-managing agencies on the Great Plains.

The isolated escarpments making up the Sioux District units represent significant habitat features on the high plains, with woodland and riparian habitats which are elsewhere rare or absent. This corresponds with a relatively diverse flora of typical Great

Plains elements combined with boreal, Rocky Mountain and eastern deciduous floras. The isolated escarpments also represent features of biogeographic interest, lying between the zones of glacial advance from the Black Hills to the south, and from the continental ice sheets to the north.

The Sioux District presents a challenge to Regional U.S. Forest Service policy in setting meaningful standards for sensitive species designation because it straddles two states having major differences in floras, both corners of which are botanically poorly known and where the peripheral eastern species rare in one state overlap with the peripheral western species that are rare in the neighboring state. The Sioux District also provides tremendous opportunity to conduct a study spanning state lines near this remote intersection of three state boundaries, and a prospect for integrating disparate study area information and state species lists for a more cohesive picture of key Regional botanical resources.

We recommend that this baseline survey information be incorporated in management planning, and that extended studies be conducted on the following:

- Late season survey in mesic habitats of at least the Cave Hills for *Aster pauciflorus*, *Gentiana affinis* and *Solidago sparsiflora*; and the Long Pines for *Sphenopholis obtusata* var. *major*

- Extended survey around East Short Pines boundaries with use of aerial photos for identifying the loose sand habitats of *Chenopodium subglabrum* and the boggy habitat of *Carex vesicaria*

- Extended survey in the North End of Long Pines for at least *Phlox andicola* and *Physaria brassicoides*.

In the future, all new sightings of plant species recommended for sensitive or watch status on the Sioux District should be collected or photographed as compatible with species conservation. In addition, basic information should be collected on the Montana or South Dakota sensitive plant forms for documenting sensitive plant species records. A half-day training session for biologists (including seasonal employees) and other interested field people would heighten interest and awareness and provide needed training skills for applying technical information in the field.

This preliminary study spanning state lines presents an opportunity to integrate disparate study area information and state species lists to provide a more cohesive picture of key regional botanical resources. It provides a synthesis and framework for building botanical resource information and developing a District sensitive plant species program.

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Appendix A (MT). Preliminary target species in Montana

SCIENTIFIC NAME	USFS STATUS	STATE, GLOBAL RANK	PRESENT ON DISTRICT?	HABITAT
Amorpha canescens	-	G5 S1	no	Prairie and sparsely wooded uplands
Asclepias stenophylla	-	G4G5 S1	no	Sandy prairie
Aster frondosus	-	G4 S1	no	Moist, often alkaline soils
Aster ptarmicoides	-	G5 S1	no	Dry prairie, often sandy or on limestone
Astragalus barrii	sensitive	G3 S3	no	Dry, rocky prairie knolls
Athysanus pusillus	-	G4 S1	no	Dry prairie or steppe
Bidens comosa	-	G5 S1	no	Moist margins of rivers and wetlands
Carex eburnea	-	G5 SU	no	Woodlands
Carex gravida	-	G5 S1	?	Visher coll. from river valley
Carex torreyi	-	G4 S1	Long Pines	Moist, open woods and meadows
Ceanothus herbaceus	-	G?T? S1	no	Open pine forests, moist plains
Celastrus scandens	-	G5 S1	no	Hardwood draws
Chenopodium subglabrum	sensitive (ND)	G2G4 S1	no	Sandy river terraces or sand dunes
Cyperus schweinitzii	-	G5 S1	no	Sand dunes

Cypripedium calceolus	sensitive	G5Q S2S3	no	Wet forest edges, springs, alder swamps
Dalea enneandra	-	G5 S1	no	Dry prairie, often calcareous
Dalea villosa	-	G5T? S1	no	Sand dunes
Dichanthelium oligosanthes	-	G5T5 S1	no	Open prairie, woodlands
D. wilcoxianum	-	G5 S1	no	Open prairie, woodlands
Elatine americana	-	G4 S1	no	Muddy shores, shallow water
Eleocharis xyridiformis	-	G4 S1	no	Shorelines
Eupatorium maculatum	-	G5TU S1	no	Wet meadows
Linaria canadensis	-	G4G5 S1	no	Dry, often sandy prairie
Lomatium nuttallii	-	G3 S1	no	Barren hills
Mentzelia montana	-	G4 S1	no	Grasslands
Mentzelia nuda	-	G5 S1	no	Sandy or gravelly open slopes
Mentzelia pumila	-	G4 S2	no	Sandy, dry grassland and woodland
Mirabilis hirsuta	-	G5 S1	no	Sandy grassland
Penstemon angustifolius	-	G5 S1	no	Sandy to gravelly grassland
Penstemon grandiflorus	-	G5 S1	no	Sandy to loamy prairie
Phlox andicola	-	G4 S1	no	Dry, sandy or gravelly prairie
Physalis heterophylla	-	G5 SU	no	Variable
Physalis virginiana	-	G? SU	no	Variable

Prunus pumila	-	G5 S1	no	Sandy or rocky knolls
Psoralea hypogaea	-	G3G4 S1	no	Sandy prairie, sand dunes
Quercus macrocarpa	-	G5 S1	no	Variable microhabitats
Solidago sparsiflora	-	G? S1	no	Open, sandy coniferous woods or rocky slopes
Sphenopholis obtusata	-	G5T5 S1	yes	Wet meadows, often in partial shade
Sporobolus asper	-	G5 SH	no	Prairie
Sporobolus neglectus	-	G5 S1	no	Sandy or rocky successional settings
Suckleya suckleyana	-	G5 SU	no	Dried lakeshores, streams, roadsides
Triglochin concinnum var. debile	-	G5T4 S2	no	Alkaline watercourses, peatlands, washes
Viburnum lentago	-	G5 S1	no	Rocky, open woods, streamsides

Appendix A (SD). Preliminary target species of South Dakota

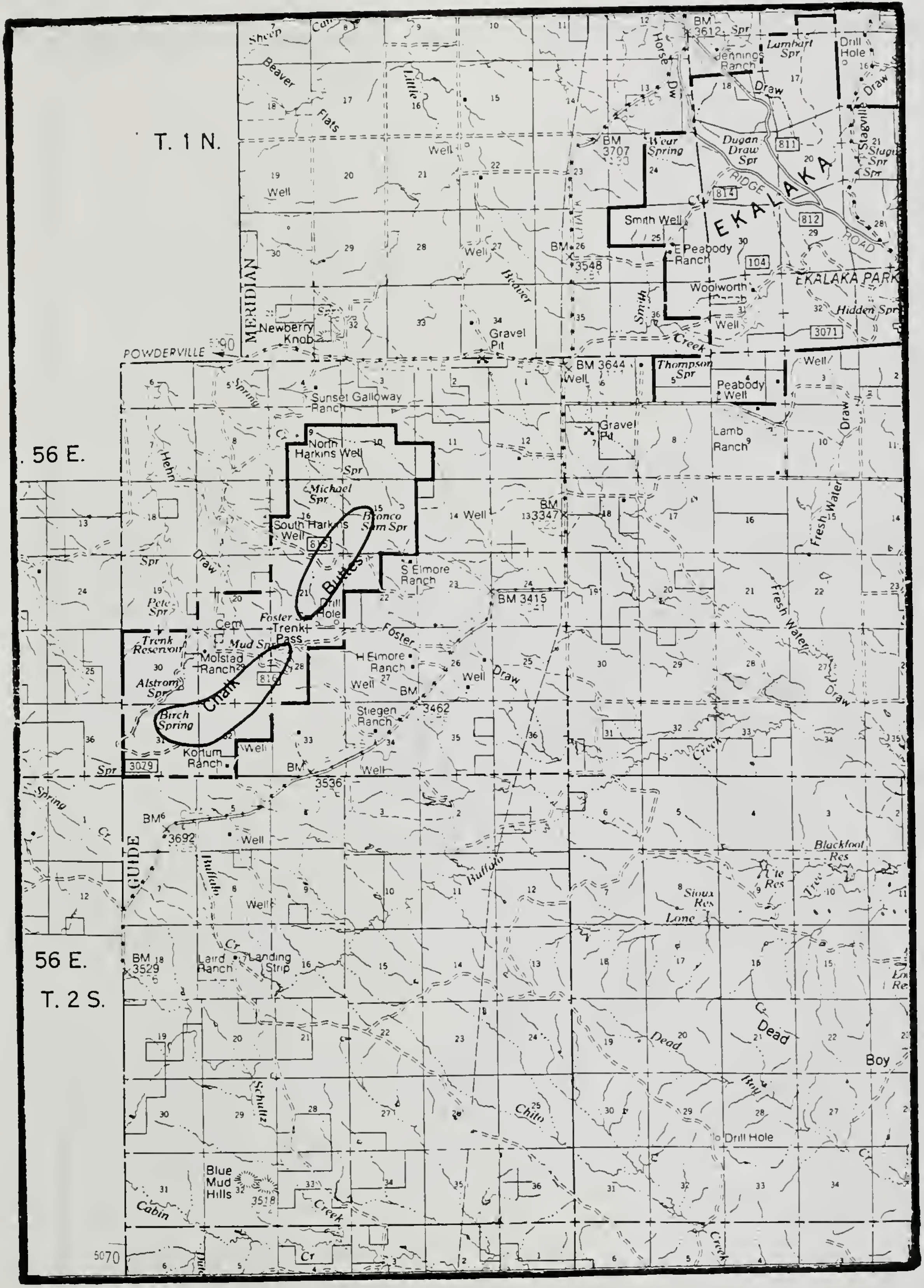
SCIENTIFIC NAME	USFS STATUS	STATE, GLOBAL RANK	PRESENT ON DISTRICT?	HABITAT
Aster pauciflorus	-	G5 SU	South Cave Hills	Dry or drying alkaline sites
Astragalus barrii*	sensitive	G3 S3	no	Dry, rocky knolls
Botrychium lunaria	-	G5 SH	no	Moist variable settings under light disturbance
Botrychium matricarifolium	-	G5? SU	no	Moist woods
Botrychium multifidum	-	G5 S2	no	Moist meadows and rich woods
Botrychium simplex	sensitive (ND,ID)	G5 SU	no	Most, open woodlands
Chaenactis douglasii	-	G5 SU	Slim Buttes? Short Pines?	Dry, rocky hillsides
Chenopodium subglabrum	sensitive (ND)	G2G4 SU	no	Sandy river terraces, sand dunes
Cypripedium calceolus	sensitive (ID,MT)	G5 SU	no	Wet forest edges, springs, alder swamps
Erigeron ochroleucus	-	G5 S2?	no	Ridge outcrops, often calcareous
Eriogonum visheri	sensitive	G3 S3	no	Badlands outcrops and washes
Festuca idahoensis	-	G5 SU	North Cave Hills	Upland prairie and open woods
Fimbristylis autumnalis	-	G5 SH	no	Moist-to-dry sandy prairies, stream sides, pond shores

Gentiana affinis	-	G5 S2	Cave Hills?	Moist meadows
Gentiana puberulenta	-	G4G5 S4?	no	Upland woods and prairies
Haplopappus armerioides	-	G4 SU	Slim Buttes, North Cave Hills	Dry prairie, rocky slopes
Haplopappus multicaulis	-	G4 SU	no	Barren plains settings
Ipomopsis spicata	-	G4? S4?	no	Gravelly slopes
Lesquerella arenosa var. argillosa	-	G5T2 SU	no	Sandy plains
Mertensia ciliata	-	G5 S1	Slim Buttes, West Short Pines?	Damp thickets, shady streamsides, moist ledges
Microsteris gracilis	-	G5 SU	no	Dry sandy or gravelly prairies; streamsides, disturbed areas
Navarretia intertexta	-	G5 SH	no	Vernal pools, buffalo wallows
Oenothera flava	-	G5 SU	no	Prairie swales with claypan,stream valleys
Penstemon nitidus	-	G5 SU	Slim Buttes	Rocky or gravelly prairie
Phacelia linearis	-	G5 SU	no	Dry, sandy or gravelly prairie
Picradeniopsis woodhousei	-	G4G5 SU	no	Open high plains
Populus angustifolia	sensitive (ND)	G5 S4?	no	Springs, woody draws

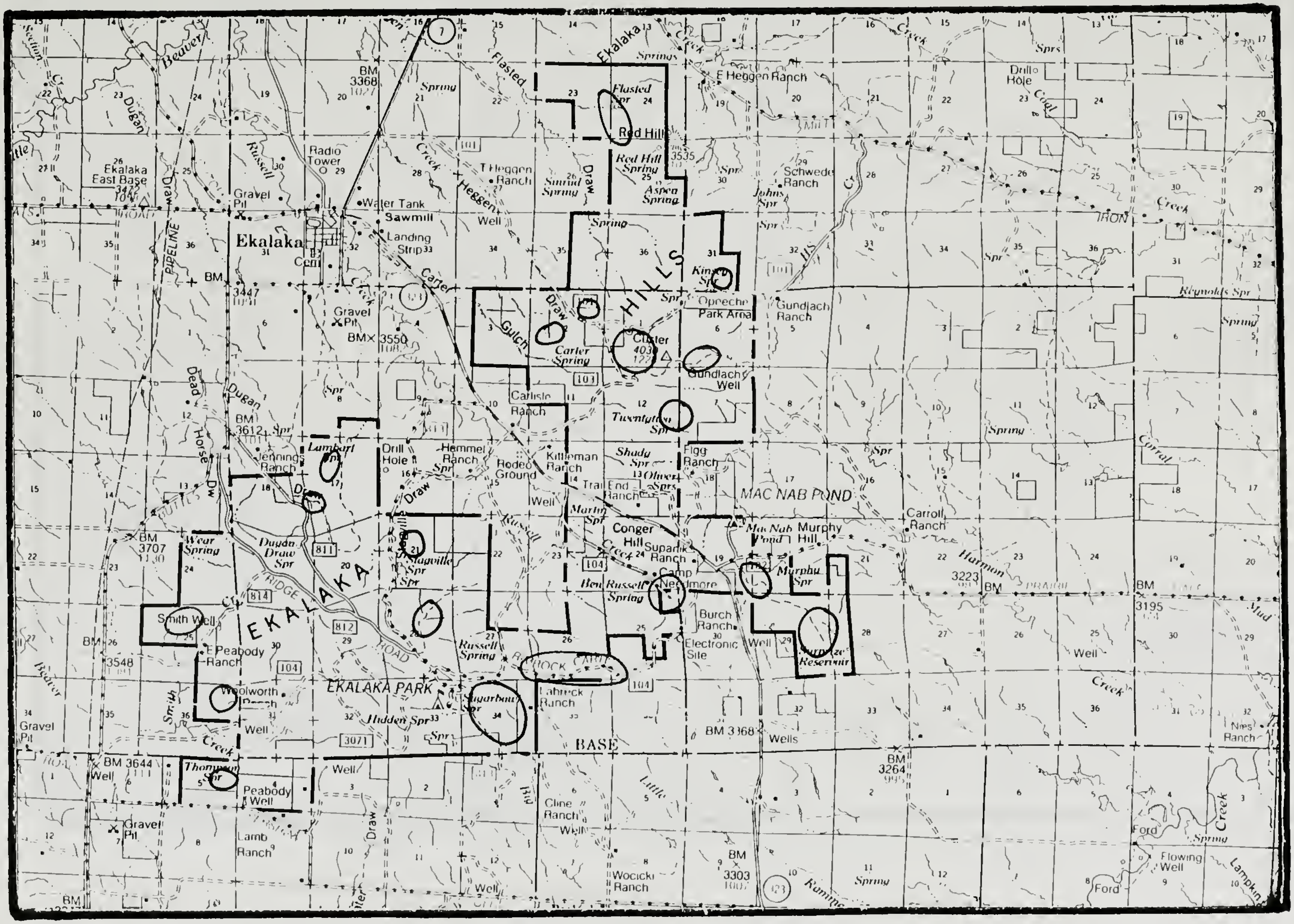
Solidago sparsiflora	-	G? SU	no	Open, sandy coniferous woodlands, rocky slopes
Solidago speciosa	-	disjunct	no	Tallgrass prairie
Townsendia exscapa	-	G5 S4?	no	Open dry plains
Tripterocalyx micrantha	-	G? SH	no	Sandy floodplains, hillsides

Appendix B (MT). Map showing primary search routes in Montana

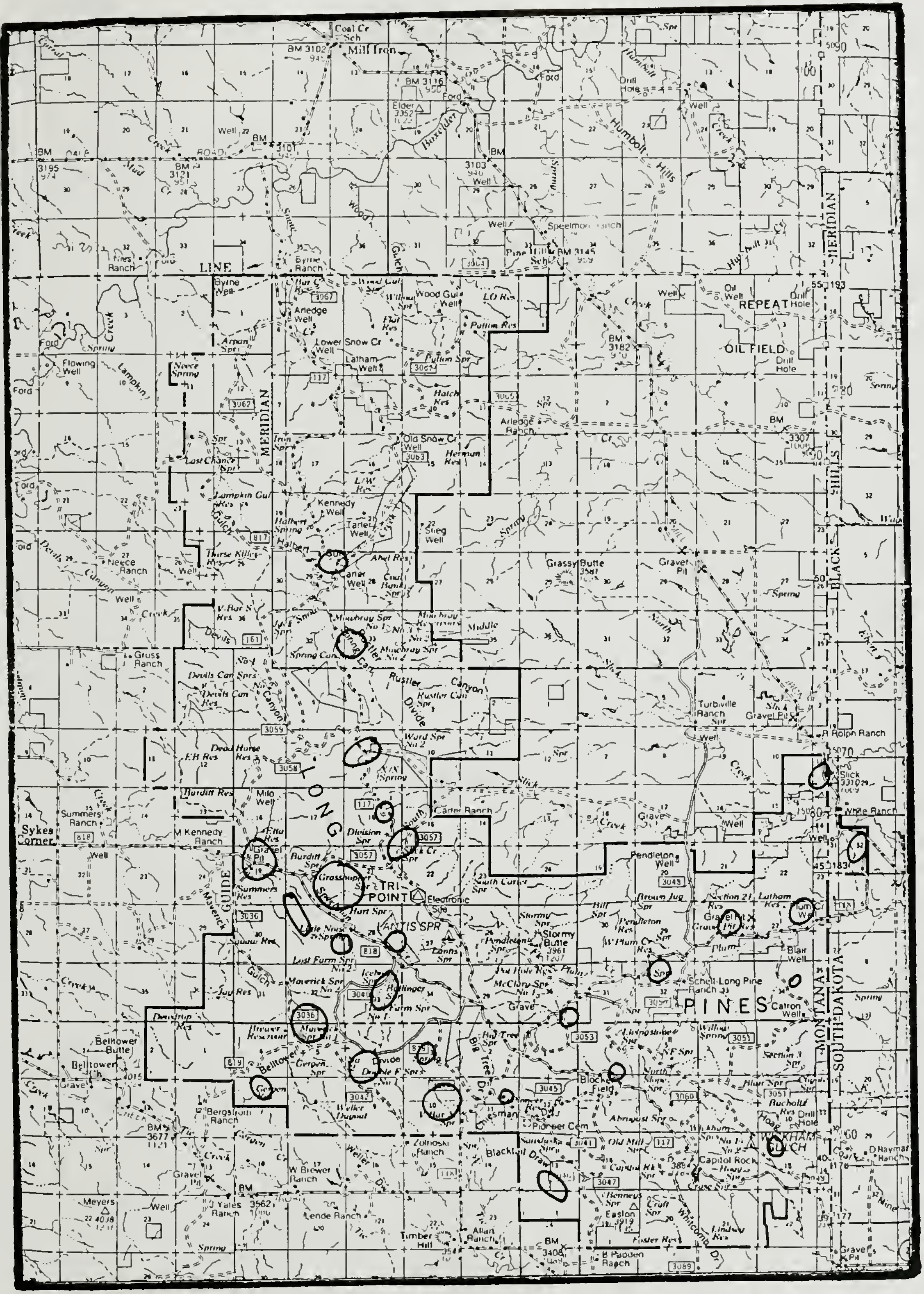
CHALK BUTTES primary areas surveyed



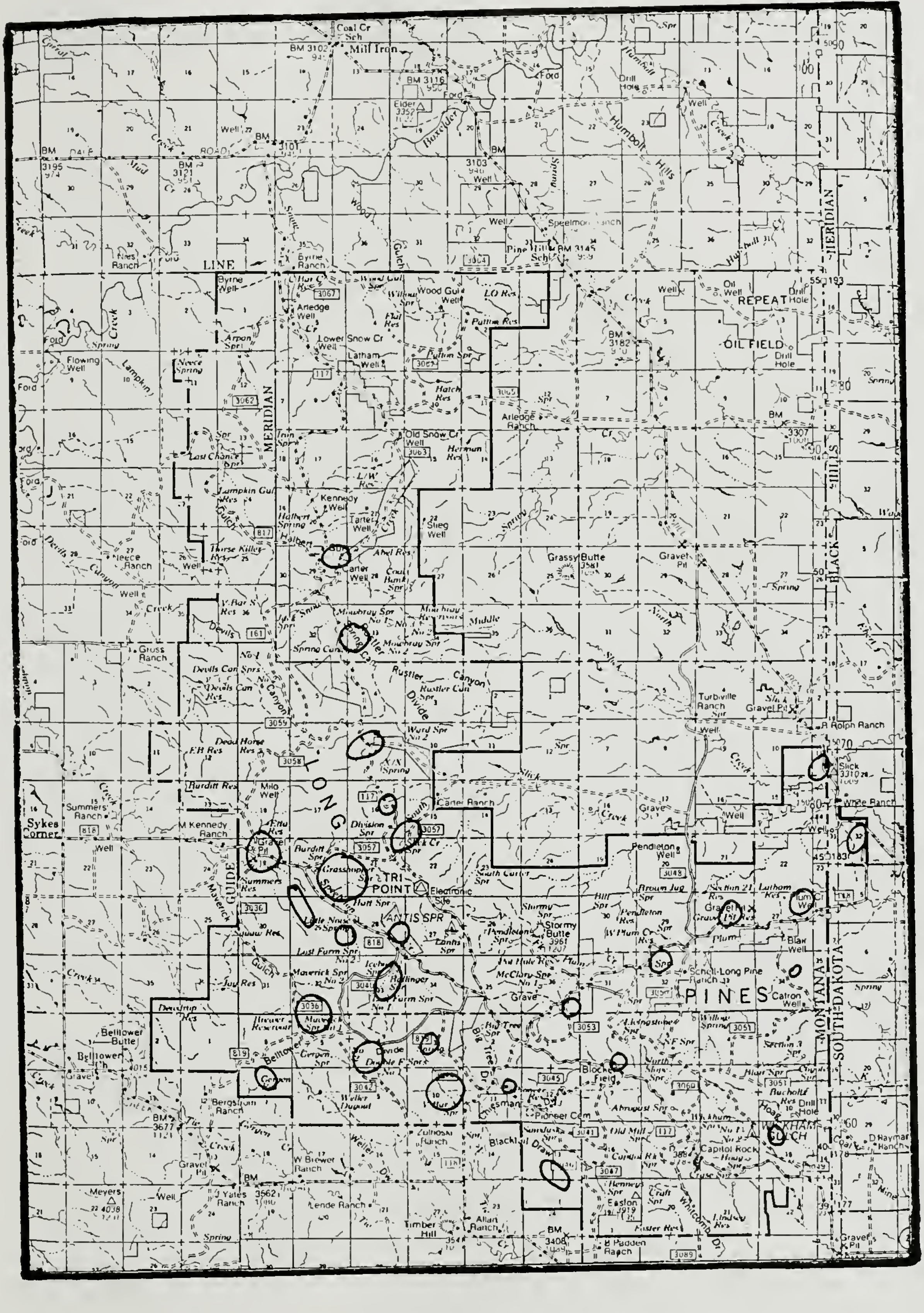
EKALAKA HILLS primary areas surveyed



LONG PINES primary areas surveyed

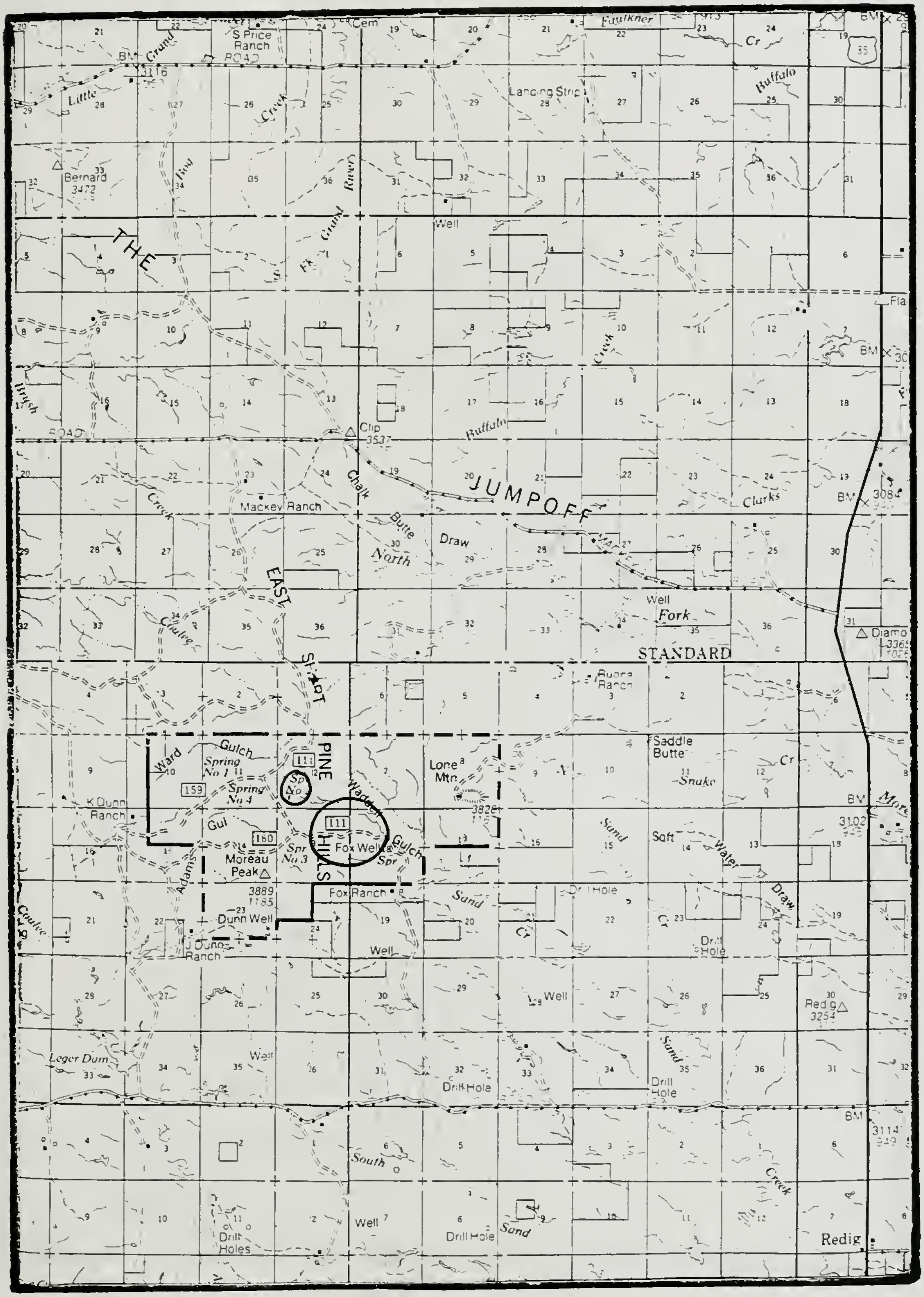


LONG PINES primary areas surveyed

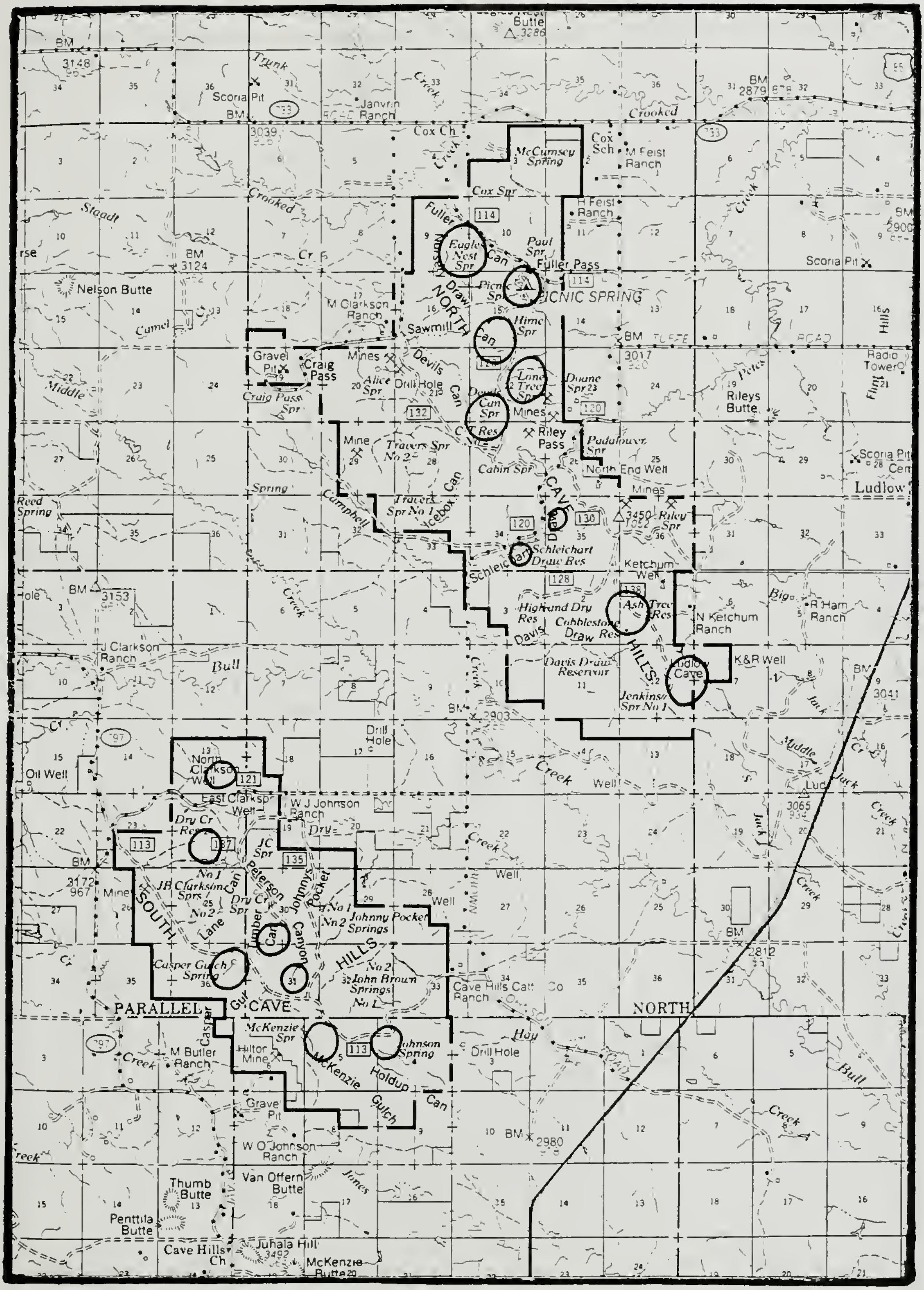


Appendix B (SD) Map showing primary search routes in South Dakota

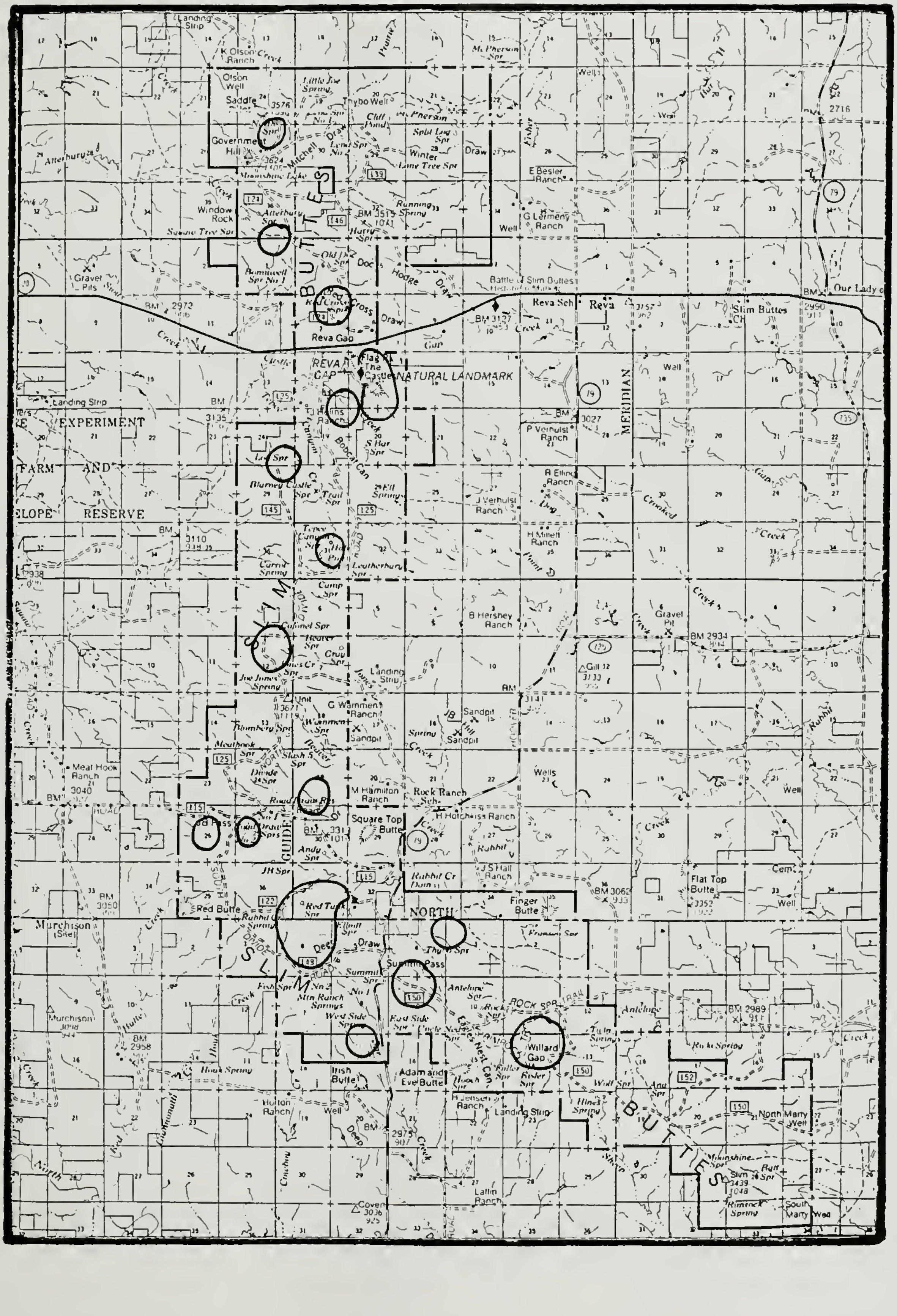
EAST SHORT PINES primary areas surveyed



NORTH CAVE HILLS, SOUTH CAVE HILLS primary areas surveyed



SLIM BUTTES primary aREAS SURVEYED



Appendix C Field form for transcribing sensitive species information

PLANT SPECIES OF SPECIAL CONCERN SURVEY FORM

MONTANA NATURAL HERITAGE PROGRAM
1515 E. 6TH AVE., HELENA, MT 59620

E OF SURVEY: _____/_____/_____

ERVER(S): ______________________________

____

K LOCATION/POSITION TITLE (Forest/District, District/Resource Area of observer(s)): ______________________________

____

ONOMY:

ILY: ______________________________ SCIENTIFIC NAME: ______________________________

ATION: (Attach a copy of pertinent 7.5' or 15' topographic map section with locations of populations/subpopulations lined, one map for each sensitive species described)

NTY: ______________________________ USGS QUADRANGLE: ______________________________

NSHIP: ________ RANGE: ________ SECTION: ________ 1/4 SEC.: ________

ITIONAL T/R/S, SECTIONS or 1/4 SECs.: ______________________________

VATION (at population center (and range of population if known)): ______________________________

IONAL FOREST/BLM DISTRICT: ______________________________ F.S. DISTRICT/ BLM RESOURCE AREA: ______________________________

D OWNERSHIP/MANAGEMENT (If not USFS/BLM): ______________________________

EST STAND OR ALLOTMENT NUMBER: ______________________________

ECTIONS TO SITE (refer to roads, trails, geographic features, etc.):

____

____

____

ITAT:

ETATION STRUCTURE WITHIN POPULATION AREA:

AL TREE COVER (%) ______________________________ TOTAL SHRUB COVER (%) ______________________________

AL FORB COVER (%) ______________________________ TOTAL GRAMINOID COVER (%) ______________________________

AL MOSS/LICHEN COVER (%) ______________________________ TOTAL BARE GROUND COVER (%) ______________________________

OCIATED PLANT COMMUNITY:(list dominant species currently present, include age structure if known):

____

____

ITAT TYPE: ______________________________

ITIONAL ASSOCIATED PLANT SPECIES: ______________________________

____

____

ECT (S, SE, NNW, etc.): ________ % SLOPE: ________ SLOPE SHAPE (concave, convex, straight, etc.): ____________

HT EXPOSURE (open, shaded, partial shade, etc.): ____

OGRAPHIC POSITION (crest, upperslope, midslope, lowerslope, bottom, etc.): ____________________________

STURE: (dry, moist, saturated, inundated, seasonal seepage, etc.): ______________________________

ENT MATERIAL: ____________________

MORPHIC LAND FORM (e.g. glaciated mountain slopes and ridges, alpine glacial valley, rolling uplands, breaklands,
uvial-colluvial-lacustrine (floodplains, terraces etc.), rockslides)

____

L TEXTURE: ______________________________________

DENCE OF DISTURBANCE: ____

____

ULATION SIZE:

IMATED NUMBER OF INDIVIDUALS (or exact count, if feasible; if plants are spreading vegetatively, indicate number of

ial stems): ____

BER OF SUBPOPULATIONS (if applicable): ____

E OF AREA COVERED BY POPULATION (acres): ____

LOGY:

NOLOGY (percentage flowering, fruiting, vegetative): ____

SYMBIOTIC OR PARASITIC RELATIONSHIPS?: ____

DENCE OF DISEASE, PREDATION OR INJURY?: ____

RODUCTIVE SUCCESS (evidence of seed dispersal and establishment): ____________________________

JMENTATION:

TOGRAPH TAKEN? (if so, indicate photographer and repository): ____________________________________

CIMEN TAKEN? (if so, list collector, collection number, and repository): ______________________________

____

NTIFICATION (list name of person making determination, and/or name of flora or book used): ______________

____

DATA PLOT NUMBER (attach photocopied data sheets): ________________________________

MENTS:

(WHEN COMPLETED, SEND TO ADDRESS ON FRONT)

Appendix D (MT) EORs and maps showing precise occurrence locations in Montana

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

entific Name: ASCLEPIAS OVALIFOLIA
mon Name: OVALLEAF MILKWEED

bal rank: G3G5 Forest Service status:
te rank: S1 Federal Status:

ment occurrence code: PDASC021D0.001
ment occurrence type:

vey site name: ICEBOX SPRING
EO rank:
rank comments:

nty: CARTER

S quadrangle: TIMBER HILL

nship:	Range:	Section:	TRS comments:
S	061E	33	NE4

Precision: S
Survey date: Elevation: 3760 - 3840
st observation: 1994-07-02 Slope/aspect: 2-5% / NORTH
st observation: 1994-07-02 Size (acres): 1

ation:
CA. 25 MILES SOUTHEAST OF EKALAKA.

ment occurrence data:
2 SUBPOPULATIONS, AT LEAST 400 PLANTS, 30-40% IN FLOWER, A FEW IN EARLY FRUIT. MANY STERILE STEMS, EXTENSIVE COLONY.

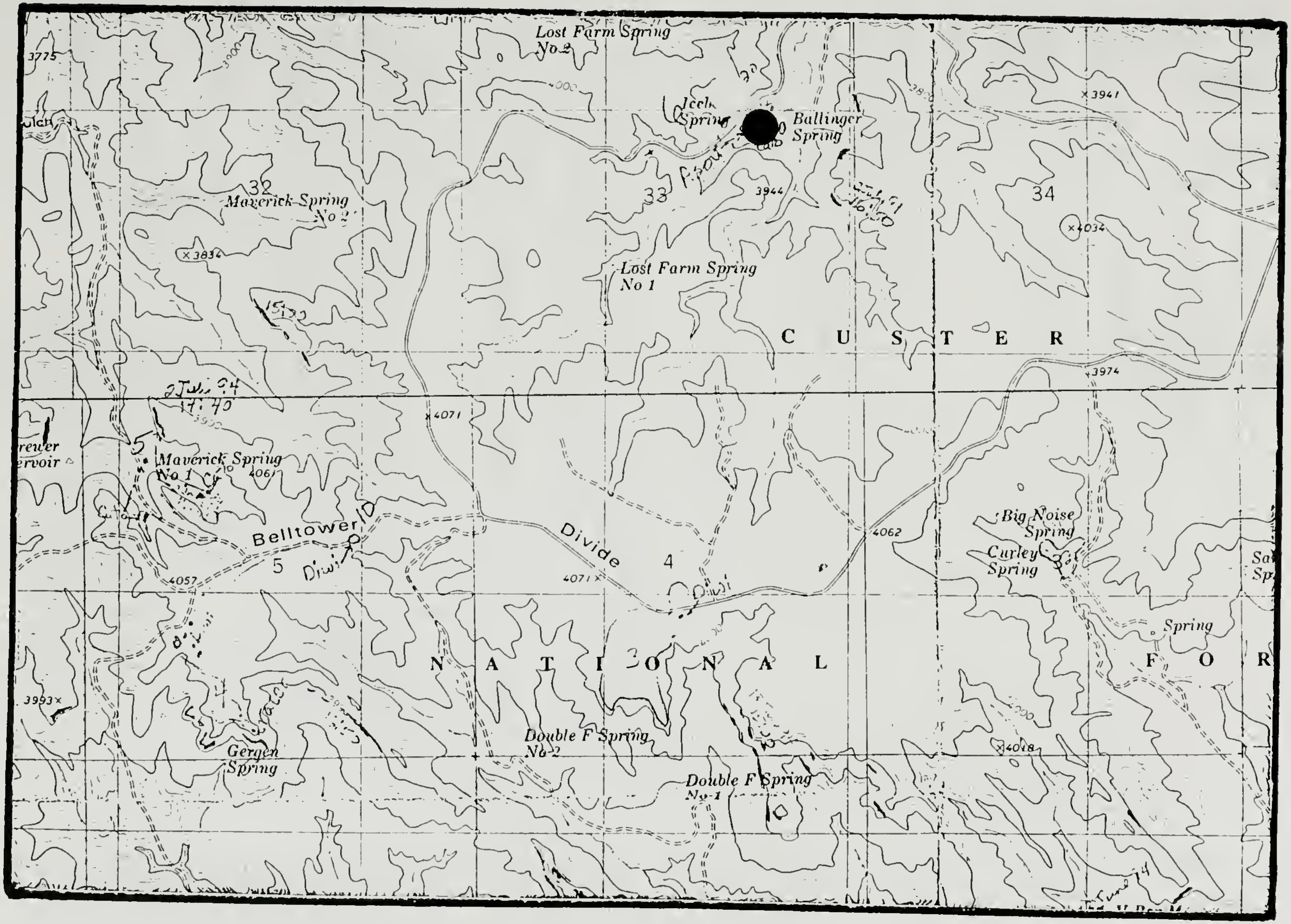
eral site description:
DRY, PARTIALLY SHADED, NARROW TERRACE ALONG DRAINAGE IN DISSECTED MESA. SANDSTONE PARENT MATERIAL, SANDY LOAM SOIL. ASSOCIATED SPECIES: POA PRATENSIS, MAHONIA REPENS, SYMPHORICARPOS OCCIDENTALIS, GALIUM BOREALE, STIPA VIRIDULA, AGROPYRON SMITHII (SPARSE), SMALL PRUNUS VIRGINIANA, CRATAEGUS SP., ROSA ACICULARIS, AGROPYRON CANINUM, SMILACINA STELLATA, LACTUCA, APOCYNUM ANDROSAEMIFOLIUM, VICIA AMERICANA, THALICTRUM VENULOSUM, ACHILLEA MILLEFOLIUM.

d owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

ments:
OBSERVED BY K. DUEHOLM AND B. HEIDEL. HEAVY AND MODERATE GRAZING IN AREA.

ormation source: HEIDEL, BONNIE. [BOTANIST] MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVENUE, P.O. BOX 201800, HELENA, MT 59620-1800. WORK: 406/444-3009.

cimens: DUEHOLM, K. (12217) AND B. HEIDEL. 1994. MONTU.



ASCLEPIAS OVALIFOLIA.001
TIMBER HILL QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

entific Name: ASCLEPIAS STENOPHYLLA
mon Name: NARROWLEAF MILKWEED

oal rank: G4G5 Forest Service status:
te rank: S1 Federal Status:

ment occurrence code: PDASC021U0.002
ment occurrence type:

vey site name: LITTLE NOISE SPRING
EO rank:
rank comments:

nty: CARTER

S quadrangle: RUSTLER DIVIDE

nship:	Range:	Section:	TRS comments:
S	061E	28	SW4SW4NW4

Precision: S
Survey date: 1994-06-12 Elevation: 3630 -
st observation: 1994-06-12 Slope/aspect: 10% / SW
st observation: 1994-06-12 Size (acres): 1

ation:
LONG PINES AREA, CA. 8.25 MILES WEST OF MT/SD BORDER. SITE IS ON SOUTHWEST SLOPE OF A SMALL HILL ABOVE A SMALL DRAINAGE, ACROSS (SW) THE SPEELMAN CREEK ROAD. FROM LITTLE NOISE SPRING.

ment occurrence data:
6 PLANTS OBSERVED, ALL IN EARLY FLOWER. SEVERAL STEMS PER PLANT; ALL APPEAR QUITE HEALTHY.

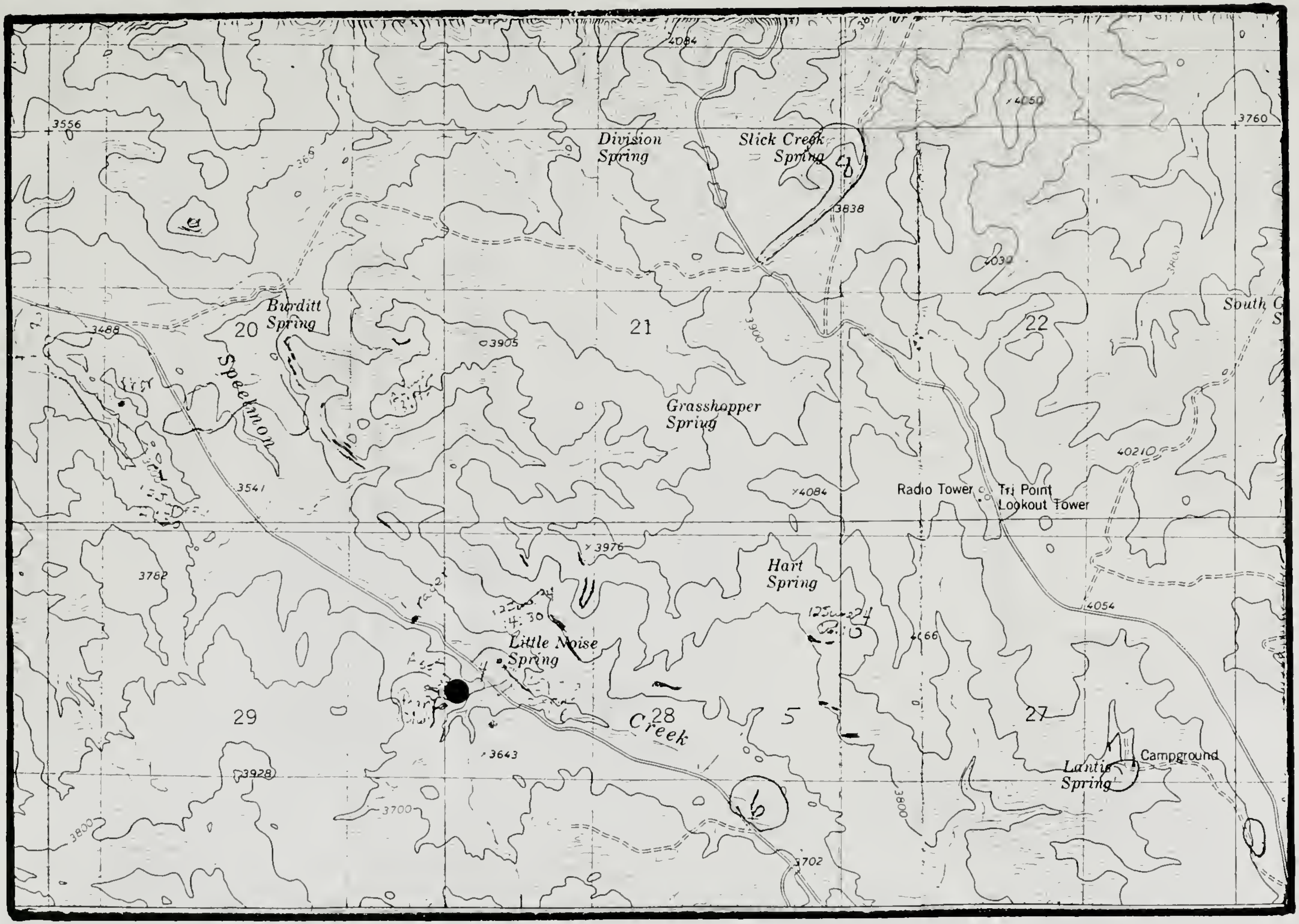
eral site description:
OPEN, DRY RIDGE ON LOWER VALLEY SLOPE, CONVEX-STRAIGHT. SANDSTONE PARENT MATERIAL, SANDY LOAM SOIL. ASSOCIATED SPECIES: CAREX HELIOPHILA, KOELERIA MACRANTHA, ARISTIDA FENDLERIANA, ARTEMISIA CAMPESTRIS, HELIANTHUS RIGIDUS, HETEROTHECA VILLOSA, ARTEMISIA LUDOVICIANA, PSORALEA ARGOPHYLLA, ERIOGONUM ANNUUM, DICHANTHELIUM WILCOXIANUM, PENSTEMON ANGUSTIFOLIUS.

d owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

ments:
A BLOWOUT (DUE TO OLD CATTLE TRAILS) IS BELOW THE SITE.

ormation source: BOTANIST, MONTANA NATURAL HERITAGE PROGRAM, 1515
EAST SIXTH AVENUE, HELENA, MT 59620-1800.

cimens: DUEHOLM, K. H. (12193). 1994.



ASCLEPIAS STENOPHYLLA.002
RUSTLER DIVIDE QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

entific Name: ASCLEPIAS STENOPHYLLA
non Name: NARROWLEAF MILKWEED

bal rank: G4G5 Forest Service status:
te rank: S1 Federal Status:

nent occurrence code: PDASC021U0.003
nent occurrence type:

vey site name: CHALK BUTTES
EO rank: D
rank comments: VERY SMALL POPULATION OR OUTLYING SEGMENT OF POPULATION.

nty: CARTER

S quadrangle: CHALK BUTTES

nship:	Range:	Section:	TRS comments:
S	057E	21	NE4SW4, NE4SE4; 22 SW4SW4

Precision: S
Survey date: 1994-07-11 Elevation: 3900 - 4065
st observation: 1994-07-11 Slope/aspect: 0-10% / E-SE
st observation: 1994-07-11 Size (acres): 1

ation:
FROM EKALAKA, GO CA. 15 MILES SSW TO FOREST SERVICE ROAD, THEN CA. 2 MILES WEST TO TRENK PASS. LOCATED TO NORTH ALONG BUTTE CRESTS.

nent occurrence data:
THREE WIDELY SCATTERED PLANTS ON SEPARATE BUTTE TOPS, POSSIBLY REPRESENTING WAIFS FROM AN UNKNOWN LOWER POPULATION ON SURROUNDING SANDY PLAIN. IN EARLY FRUIT.

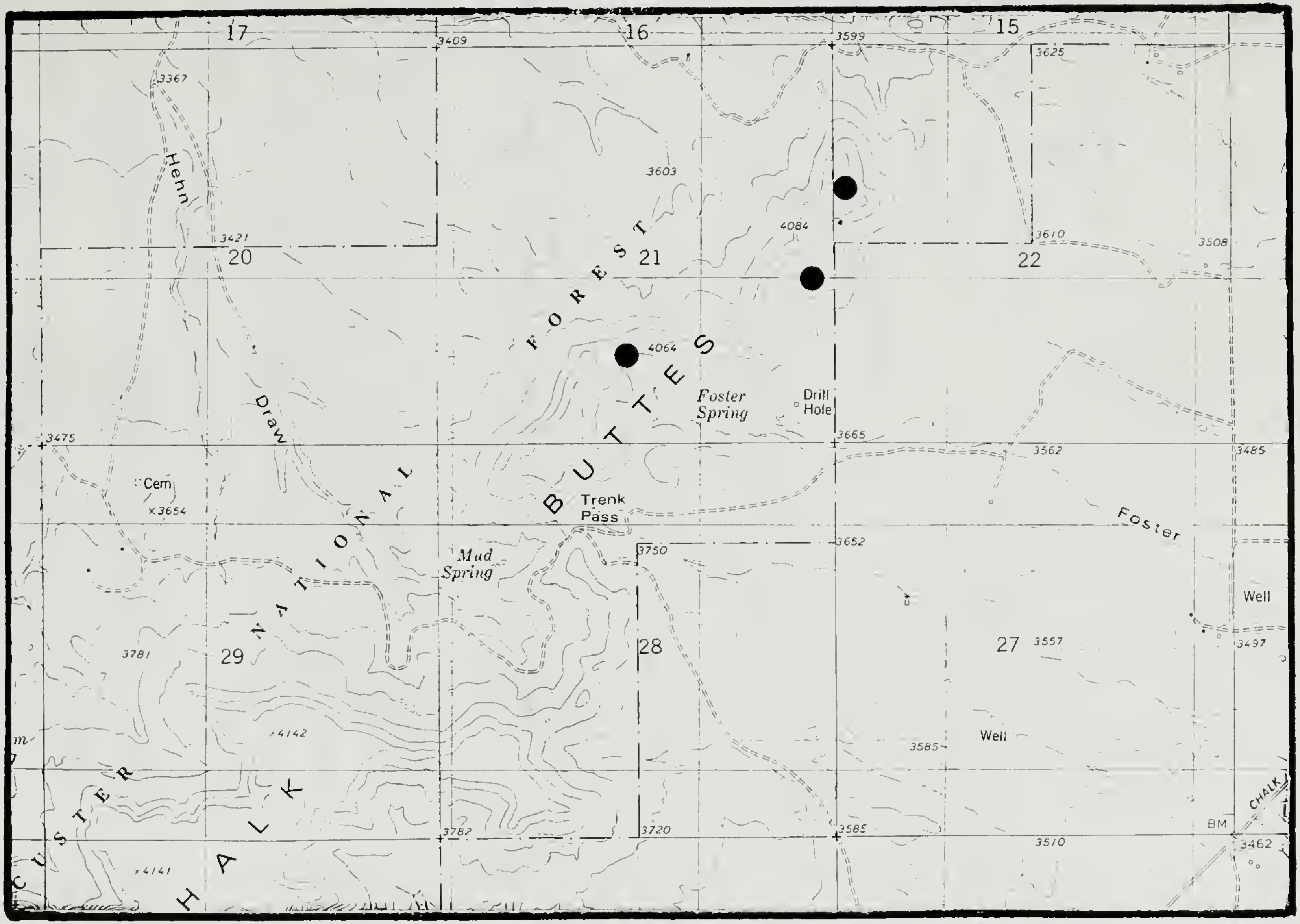
eral site description:
SCATTERED BUTTE TOPS ALONG CHALK BUTTES RIDGE SYSTEM WITH SANDY OR GRAVELLY LOAMS. THE COMMUNITY TYPES WHERE THE THREE SEPARATE PLANTS ARE FOUND INCLUDE ANDROPOGON SCOPARIUS C.T., CALAMOVILFA LONGIFOLIA C.T., AND STIPA COMATA C.T. ASSOCIATED SPECIES INCLUDE AGROPYRON SMITHII, CAREX FILIFOLIA, AND STIPA VIRIDULA, IN OPENINGS AMONG PINUS PONDEROSA.

d owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

ments:

ormation source: HEIDEL, B. AND K. DUEHOLM. 1994. SITE SURVEY OF CUSTER NATIONAL FOREST, SIOUX DISTRICT, IN CARTER CO., MONTANA AND HARDING CO., SOUTH DAKOTA.

cimens:



ASCLEPIAS STENOPHYLLA.003
CHALK BUTTES QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

entific Name: CAREX TORREYI
non Name: TORREY'S SEDGE

pal rank: G4 Forest Service status:
te rank: S1 Federal Status:

nent occurrence code: PMCYP03DT0.001
nent occurrence type:

vey site name: MAVERICK GULCH
EO rank: B
rank comments: LARGE VIGOROUS POPULATION; IMMEDIATE AREA NOT HEAVILY GRAZED
nty: CARTER
S quadrangle: TIMBER HILL

ıship:	Range:	Section:	TRS comments:
S	061E	05	W2NW4

Precision: S
Survey date: 1986-06-17 Elevation: 3850 - 3950
st observation: 1986 Slope/aspect: 5% / N, NE
st observation: 1994-07-02 Size (acres): 3

ation:
HEAD OF MAVERICK GULCH, JUST NORTH OF BELLTOWER DIVIDE, LONG PINES AREA, CA. 25 AIR MILES SOUTHEAST OF EKALAKA.

nent occurrence data:
1994: 3 SUBPOPULATIONS WITH A TOTAL OF 20 PLANTS (15 IN GULCH, 2 AT SPRING, 3 IN GULCH TO SOUTHEAST OF SPRING). MOSTLY IN LATE FRUIT.
1986: 101-1000 INDIVIDUALS, IN IMMATURE FRUIT; ENTIRE AREA NOT SURVEYED.

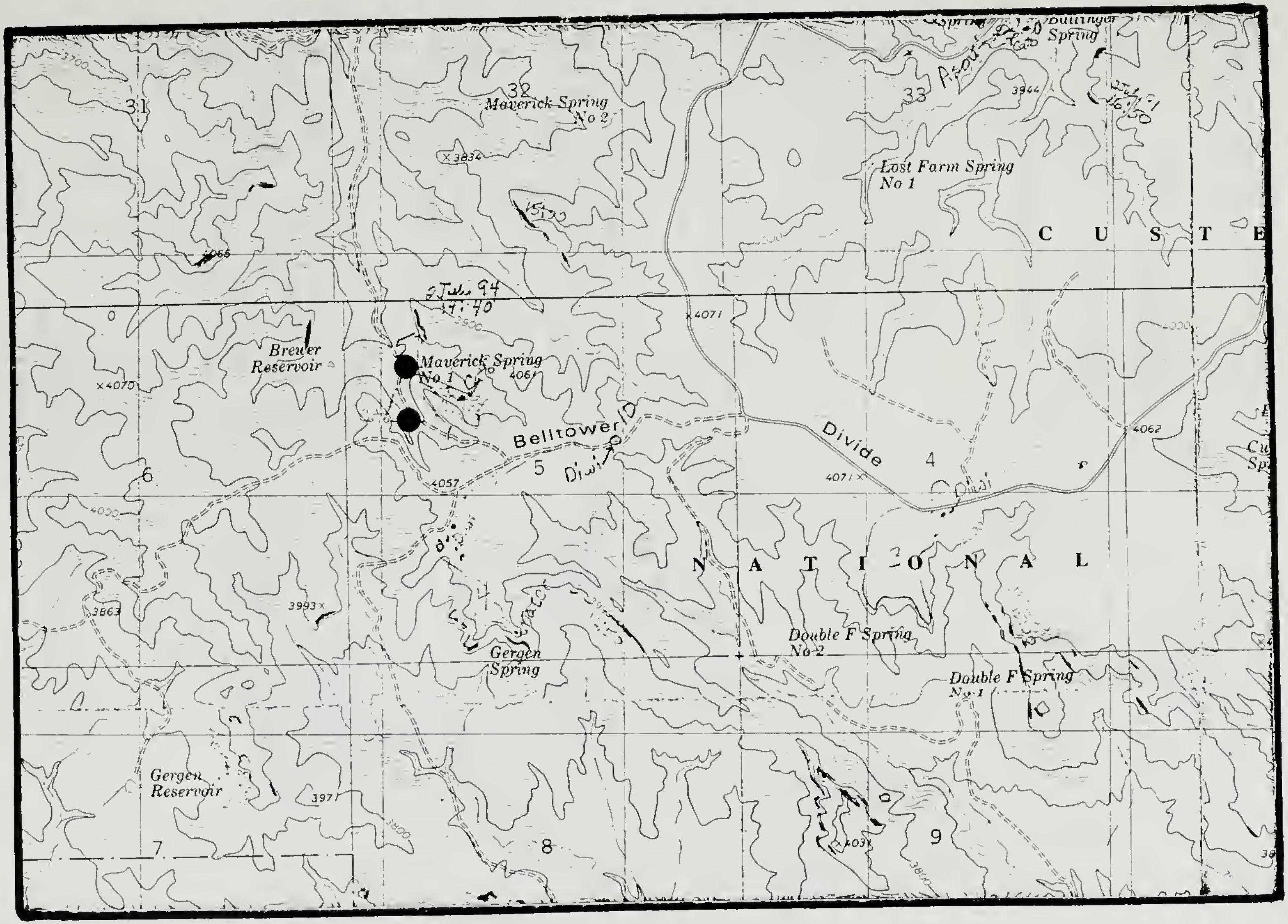
eral site description:
IN MEADOW BENEATH A PINUS PONDEROSA WOODLAND, RIDGE DRAINAGE IN DISSECTED MESA, SANDY LOAM SOILS, SANDSTONE PARENT MATERIAL. WITH BROMUS CILIATUS, BERBERIS REPENS, GALIUM BOREALE, CAREX BACKII, ARCTOSTAPHYLOS UVA-URSI, POA PRATENSIS, CAREX FOENEA, MAHONIA REPENS, PRUNUS VIRGINIANUS, SYMPHORICARPOS, ROSA ACICULARIS, APOCYNUM ANDROSAEMIFOLIUM, TARAXACUM OFFICINALE (COMPLETE LIST ON FILE AT MTHP.)

d owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

ments:
HEAVY GRAZING NEAR MAVERICK SPRING ON POA AND CAREX SPRENGELII, BUT NOT ON C. TORREYII.

ormation source: LESICA, PETER. DIVISION OF BIOLOGICAL SCIENCES,
UNIVERSITY OF MONTANA, MISSOULA, MT 59812.

cimens: LESICA, P. (3865). 1986. SPECIMEN #104639. MONTU.
DUEHOLM, K. H. (12215) AND B. HEIDEL. 1994. MONTU.



CAREX TORREYI.001
TIMBER HILL QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: CAREX TORREYI
Common Name: TORREY'S SEDGE

Global rank: G4 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PMCYP03DT0.002
Element occurrence type:

Survey site name: SOUTH HEGGEN CREEK
EO rank:
EO rank comments:

County: CARTER
USGS quadrangle: CAMP NEEDMORE
TERRELL CREEK

Township:	Range:	Section:	TRS comments:
001N	058E	2	SW4NW4

Precision: M
Survey date: 1994-06-19 Elevation: 3760 -
First observation: 1994-06-11 Slope/aspect: 25(+10)% / NE
Last observation: 1994-06-19 Size (acres):

Location:
FROM SOUTHEAST OF EKALAKA TAKE HWY 323 TO OPEECHE ROAD, FOLLOW HEGGEN CREEK PAST USFS BOUNDARY AND CONTINUE CA. 4 MILES. SITE IS SSW OF 2 KNOLLS ON SOUTHWEST EDGE OF SMALL VALLEY, 80-100 M. FROM EDGE OF PINES.

Element occurrence data:
ALL IN EARLY FRUIT MATURATION, HEALTHY LOOKING POPULATION, AT LEAST 10 COLONIES WITH FLOWERING STEMS.

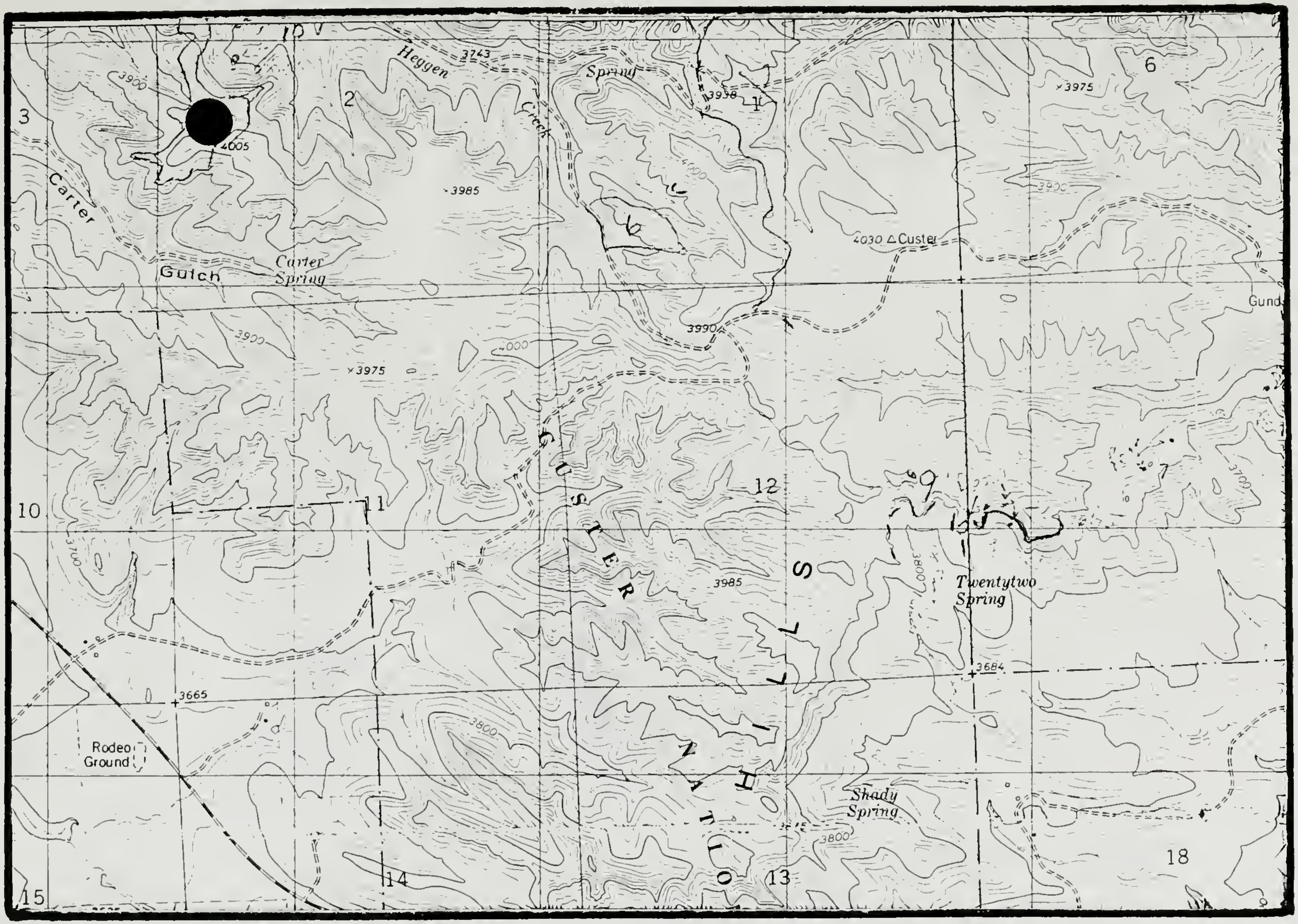
General site description:
SHADED TO PARTIAL SHADE, DRY (SLIGHTLY MOIST) CONCAVE, LOWER MIDSLOPE, PARENT MATERIAL SANDSTONE, SOIL TEXTURE DARK, SANDY LOAM, RICH HUMUS. ASSOCIATED SPECIES: MAHONIA REPENS, PRUNUS VIRGINIANA, GALIUM BOREALE, ARNICA CORDIFOLIA, TOXICODENDRON RYDBERGII, APOCYNUM ANDROSAEMIFOLIUM, THALICTRUM VENULOSUM, BROMUS CILIATUS, CAREX ROSSII, CAREX SPRENGELLI, CAREX AENEA, HEUCHERA RICHARDSONII, JUNIPERUS COMMUNIS, POPULUS TREMULOIDES, ARCTOSTAPHYLOS UVA-URSI, SMILACINA STELLATA.

Land owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

Comments:

Information source: BOTANIST, MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVENUE, HELENA, MT 59620-1800.

Specimens: DUEHOLM, K. H. (12192). 1994.



CAREX TORREYI.002
CAMP NEEDMORE QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: CAREX TORREYI
Common Name: TORREY'S SEDGE

Global rank: G4 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PMCYP03DT0.004
Element occurrence type:

Survey site name: BALLINGER SPRING
EO rank:
EO rank comments:

County: CARTER
USGS quadrangle: TIMBER HILL

Township:	Range:	Section:	TRS comments:
002S	061E	33	NE4

Precision: S
Survey date: 1994-07-02 Elevation: 3760 -
First observation: 1994-07-02 Slope/aspect: 2-8% / NORTH
Last observation: 1994-07-02 Size (acres): 2

Location:
CA. 25 AIR MILES SOUTH OF EKALAKA. PARK AT ICEBOX SPRING AND ON LOST FARM ROAD WALK SOUTHEAST OF CATTLE GUARD TO JUNCTION OF 2 DRAINAGES AT BALLINGER SPRING. PLANTS ARE ON TRIANGULAR FLAT BETWEEN DRAINAGES, MOSTLY NEAR STEEPER EASTERN SLOPES AND ABOVE DRAINAGES ON THE FLATS.

Element occurrence data:
POSSIBLY 3 SUBPOPULATIONS WITH A TOTAL OF 20 PLANTS. (CA. 12 ON EAST EDGE, 3 ON WEST SIDE, AND 2 ON WEST OF DRAINAGE ON WEST SIDE). MOSTLY IN LATE FRUIT.

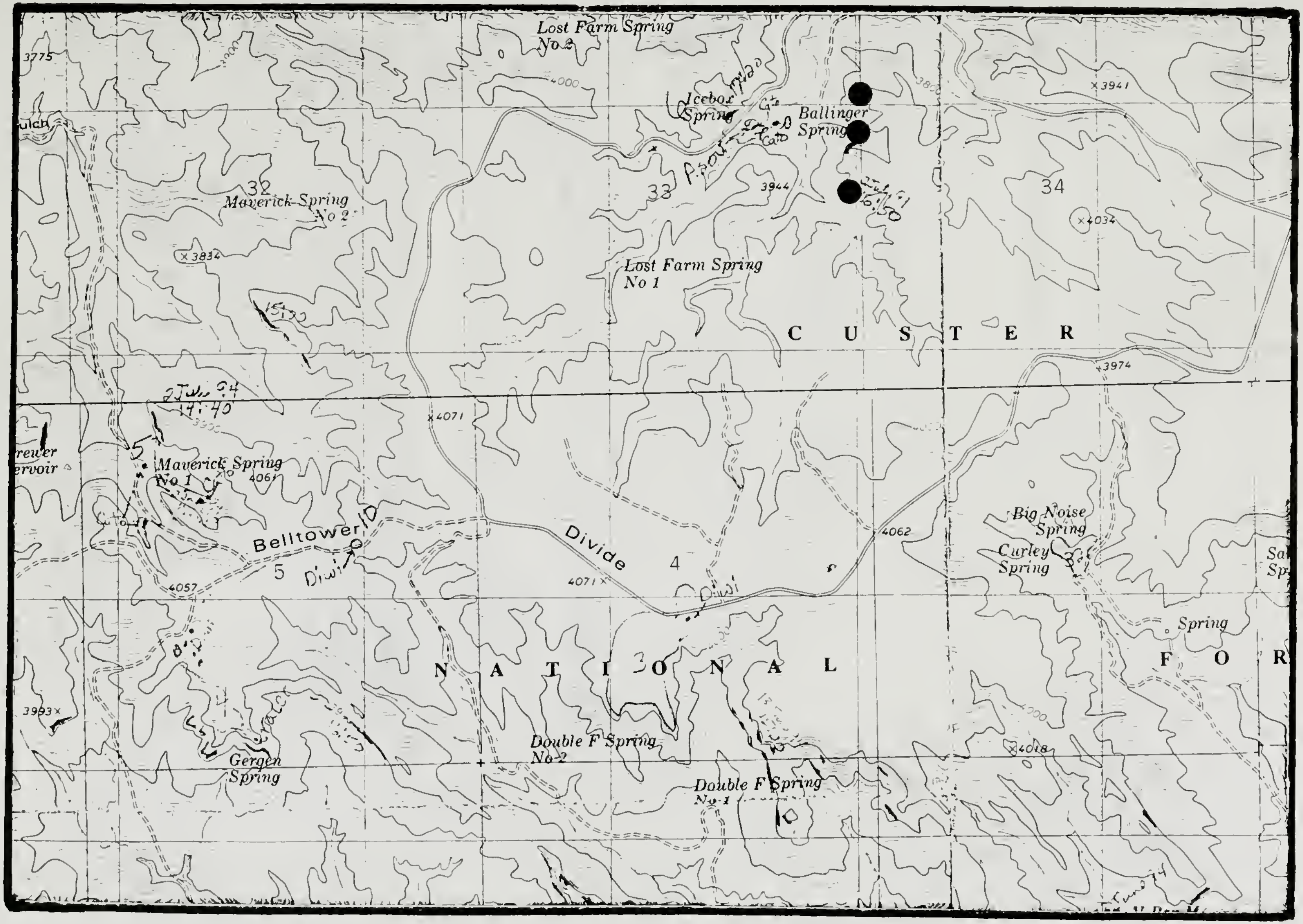
General site description:
DRY WITH SEASONAL DRAINAGE, PARTIALLY SHADED RIDGE DRAINAGE IN DISSECTED MESA. SANDY LOAM SOIL WITH PINUS PONDEROSA, MAHOMA REPENS, SMALL PRUNUS VIRGINIANA, POA PRATENSIS, ARENARIA LATERIFLORA, STIPA NELSONII, CAREX FOENEA, CAREX BREVIOR, TOXICODENDRON RYDBERGII.

Land owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

Comments:
OBSERVED BY K. H. DUEHOLM AND B. HEIDEL. DISTURBANCE BY MODERATE GRAZING.

Information source: HEIDEL, BONNIE. [BOTANIST] MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVENUE, P.O. BOX 201800, HELENA, MT 59620-1800. WORK: 406/444-3009.

Specimens:



CAREX TORREYI 004
TIMBER HILL QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: PENSTEMON ANGUSTIFOLIUS
Common Name: NARROWLEAF PENSTEMON

Global rank: G5 Forest Service status:
State rank: S2 Federal Status:

Element occurrence code: PDSCR1L0C0.005
Element occurrence type:

Survey site name: LITTLE NOISE SPRING
EO rank: B
EO rank comments:

County: CARTER

USGS quadrangle: RUSTLER DIVIDE

Township:	Range:	Section:	TRS comments:
002S	061E	28	SW4SW4NW4; 29 SE4SE4NE4

Precision: S
Survey date: 1994-06-12 Elevation: 3640 -
First observation: 1994-06-12 Slope/aspect: 5-10% / SE(&SW)
Last observation: 1994-06-12 Size (acres): 1

Location:
LONG PINES AREA, CA. 8.3 MILES WEST OF MT/SD BORDER. SITE IS ALONG SPEELMAN CREEK RD, ACROSS THE ROAD FROM LITTLE NOISE SPRING, 150M. UP DRAINAGE TO OBVIOUS SANDY BLOWOUT.

Element occurrence data:
CA. 25 PLANTS; ALL ARE IN EARLY FRUIT, ONE RETAINED FLOWERS.

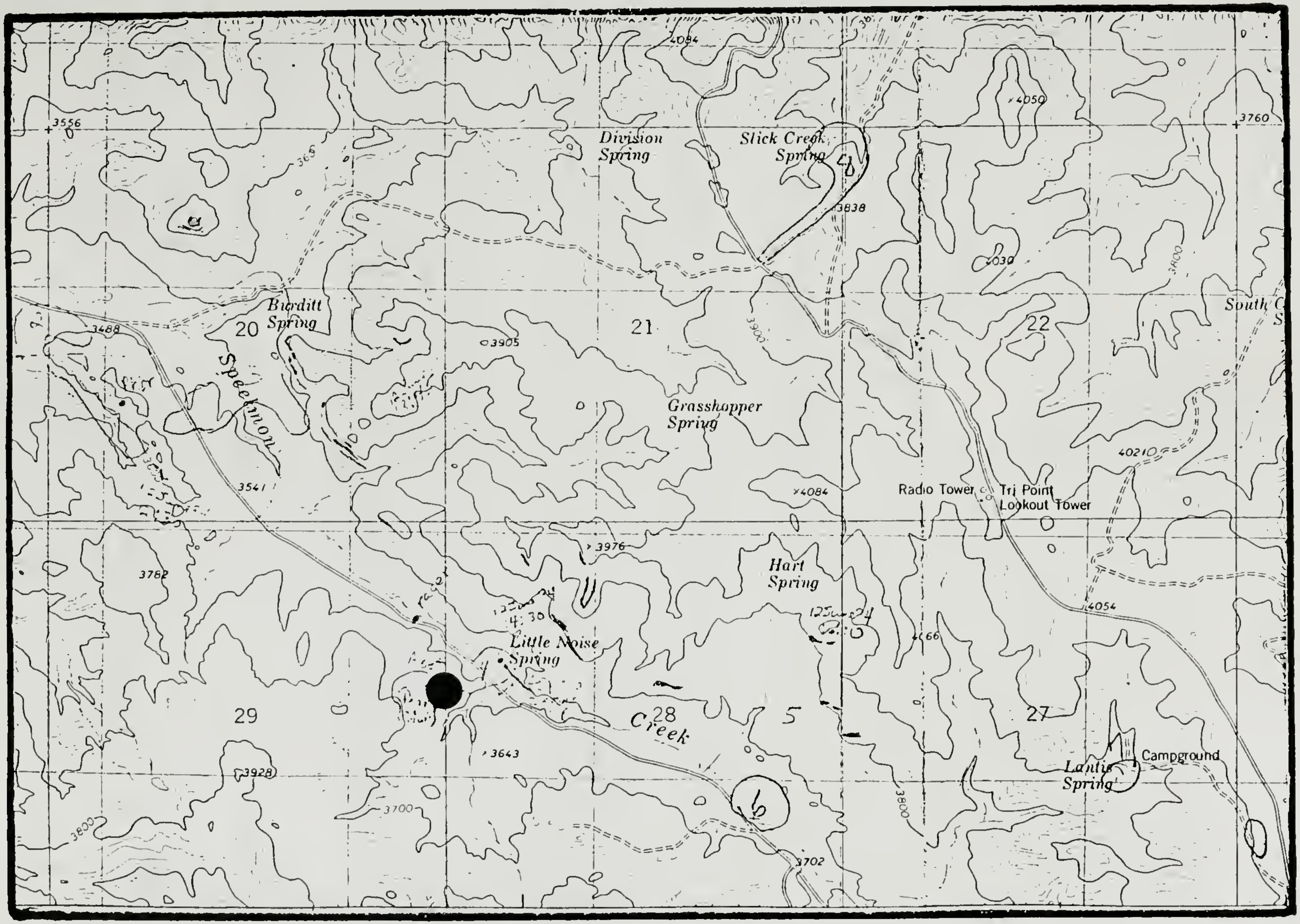
General site description:
OPEN, DRY, MID TO UPPER SLOPE, CONVEX-STRAIGHT, MAIN POPULATION IN SANDY BLOWOUT; A FEW ARE UPSLOPE IN SANDY GRASSLAND. ASSOCIATED SPECIES: ARTEMISIA FRIGIDA, ROSA ARKANSANA, TRADESCANTIA OCCIDENTALIS, OXYTROPIS LAMBERTII, LYGODESMIA JUNEEA, DICHANTHELIUM WILCOXIANUM, ARTEMISIA CAMPESTRIS, HETEROTHECA VILLOSA, HELIANTHUS RIGIDUS.

Land owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

Comments:
MAIN POPULATION IS WITHIN BLOWOUT; A FEW ALONG CATTLE TRAILS UPSLOPE, A FEW ON SANDY SW SLOPE.

Information source: BOTANIST, MONTANA NATURAL HERITAGE PROGRAM, 1515
EAST SIXTH AVENUE, HELENA, MT 59620-1800.

Specimens: DUEHOLM, K. H. (12195). 1994.



PENSTEMON ANGUSTIFOLIUS.005
RUSTLER DIVIDE QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: PENSTEMON ANGUSTIFOLIUS
Common Name: NARROWLEAF PENSTEMON

Global rank: G5 Forest Service status:
State rank: S2 Federal Status:

Element occurrence code: PDSCR1L0C0.007
Element occurrence type:

Survey site name: MACNAB CAMPGROUND
EO rank:
EO rank comments:

County: CARTER
USGS quadrangle: CAMP NEEDMORE

Township:	Range:	Section:	TRS comments:
001N	059E	19	NW4NE4NE4

Precision: S
Survey date: Elevation: 3500 -
First observation: 1994-06-16 Slope/aspect: 0-5% / SW, W
Last observation: 1994-06-16 Size (acres): 1

Location:

SITE LOCATED JUST WEST OF MACNAB CAMPGROUND (ON THE HILL, NOT BY THE POND), AT A FENCELINE AND A DOWNSLOPE ON A HILL TO THE INSIDE.

Element occurrence data:

CA. 35-40 PLANTS, 90% IN EARLY FRUIT, WITH 3 DEAD PLANTS FROM PREVIOUS YEAR AND 6 NEW SHOOTS (ROSETTES) WITH NO FLOWERING STEMS, INDICATING YOUNG PLANTS.

General site description:

DRY, MID-TO-UPPERSLOPE OF SMALL HILLS IN LOWER VALLEY SLOPE OF MESA. GRAVELLY, SANDY LOAM SOIL, SANDSTONE PARENT MATERIAL. ASSOCIATED SPECIES: AGROPYRON SPICATUM, CAREX FILIFOLIA, STIPA COMATA, SELAGINELLA DENSA, ASCLEPIAS VIRIDIFLORA, HELIANTHUS RIGIDUS, MELILOTUS OFFICINALIS, ERIOGONUM ANNUUM, ARTEMISIA CAMPESTRIS, KOLERIA MACRANTHA, TRADESCANTIA OCCIDENTALIS, ERIOGONUM FLAVUM, LITHOSPERMUM INCISUM.

Land owner/manager:

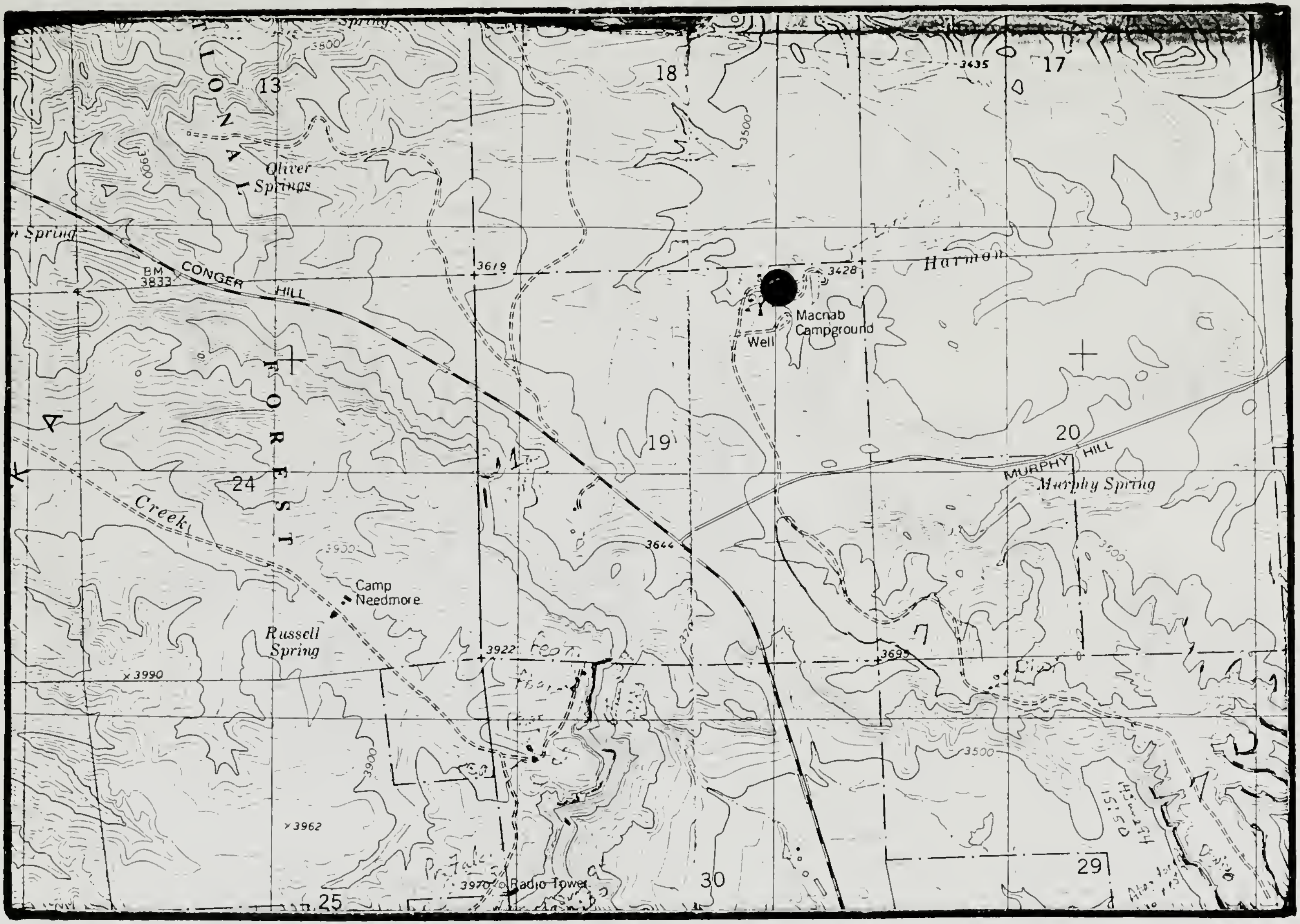
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

Comments:

OBSERVED BY K. DUEHOLM.

Information source: SENSITIVE PLANT COORDINATOR, CUSTER NATIONAL
FOREST, 2602 FIRST AVENUE NORTH, P.O. BOX 2556,
BILLINGS, MT 59103.

Specimens:



PENSTEMON ANGUSTIFOLIUS.007
CAMP NEEDMORE QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: PENSTEMON ANGUSTIFOLIUS
Common Name: NARROWLEAF PENSTEMON

Global rank: G5 Forest Service status:
State rank: S2 Federal Status:

Element occurrence code: PDSCR1L0C0.008
Element occurrence type:

Survey site name: TWENTYTWO SPRING
EO rank:
EO rank comments:

County: CARTER

USGS quadrangle: CAMP NEEDMORE

Township:	Range:	Section:	TRS comments:
001N	058E	12	NE4SE4
001N	059E	7	NW4SW4, S2NE4

Precision: M
Survey date:
First observation: 1994-06-18
Last observation: 1994-06-18
Elevation: 3820 - 3900
Slope/aspect: 10-15% / SE-SW
Size (acres): 1

Location:
RIM OF CLIFFS ABOVE TWENTYTWO SPRING. TAKE OLD 2-TRACK FROM CURVE IN FOREST SERVICE ROAD TO WHERE IT RUNS PARALLEL WITH RIM OF CLIFFS ABOVE TWENTYTWO SPRING.

Element occurrence data:
2 SUBPOPULATIONS, CA. 0.25 MILE APART, WITH CA. 18 PLANTS AT WEST END OF SITE AND CA. 22 AT EASTERN END, AND SCATTERED INDIVIDUALS BETWEEN. 95% IN EARLY FRUIT, YOUNG PLANTS PRESENT AT EAST END.

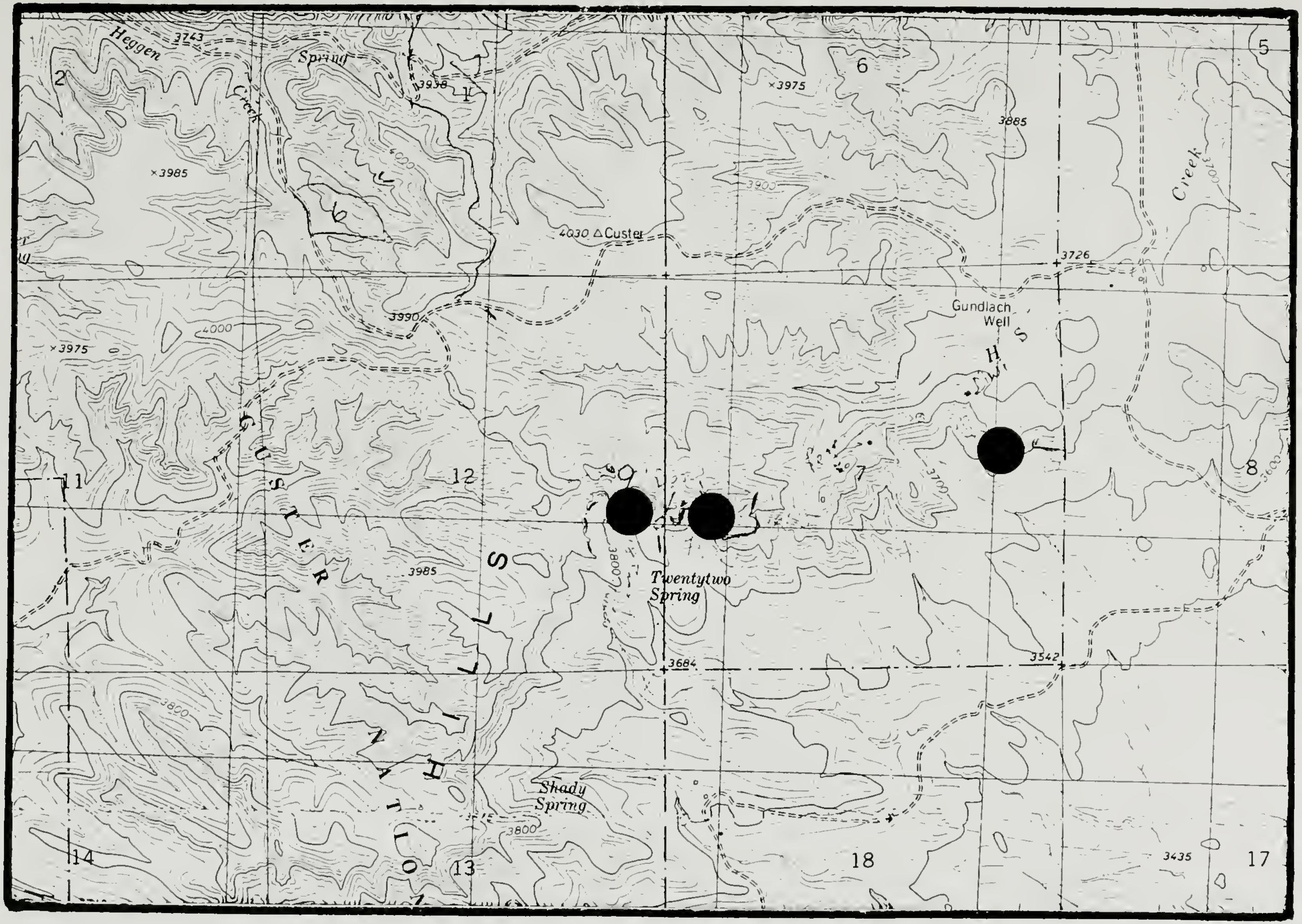
General site description:
DRY, OPEN AND PARTIALLY SHADED HILLS AND SLOPES ON RIDGE EXTENDING FROM MESA. SANDSTONE PARENT MATERIAL, GRAVELLY SAND AND GRAVELLY SANDY LOAM SOIL. ASSOCIATED SPECIES: ANDROPOGON SCOPARIUS, ASTRAGALUS FLEXUOSUS, CALOCHORTUS NUTTALLII, HELIANTHUS RIGIDUS, HETEROTHECA VILLOSA, TRADESCANTIA OCCIDENTALIS.

Land owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

Comments:
OBSERVED BY K. DUEHOLM.

Information source: SENSITIVE PLANT COORDINATOR, CUSTER NATIONAL FOREST, 2602 FIRST AVENUE NORTH, P.O. BOX 2556, BILLINGS, MT 59103.

Specimens:



PENSTEMON ANGUSTIFOLIUS.008
CAMP NEEDMORE QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: PHYSARIA BRASSICOIDES
Common Name: DOUBLE BLADDERPOD

Global rank: G5 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PDBRA22040.001
Element occurrence type:

Survey site name: SPEELMON CREEK
EO rank:
EO rank comments:

County: CARTER

USGS quadrangle: RUSTLER DIVIDE

Township:	Range:	Section:	TRS comments:
002S	061E	20	SW4

Precision: M
Survey date: Elevation: 3560 - 3580
First observation: 1994-06-12 Slope/aspect: 60% / SW, SOUTH
Last observation: 1994-06-12 Size (acres): 1

Location:
CA. 25 MILES SOUTHEAST OF EKALAKA, NEAR EAST END OF A RIDGE SOUTH OF SPEELMON ROAD IN AREA OF ORANGE-BROWN SANDSTONE OUTCROP SURROUNDED BY STEEP SHALE/CLAY SLOPES.

Element occurrence data:
CA. 20 PLANTS, MOST IN EARLY FRUIT.

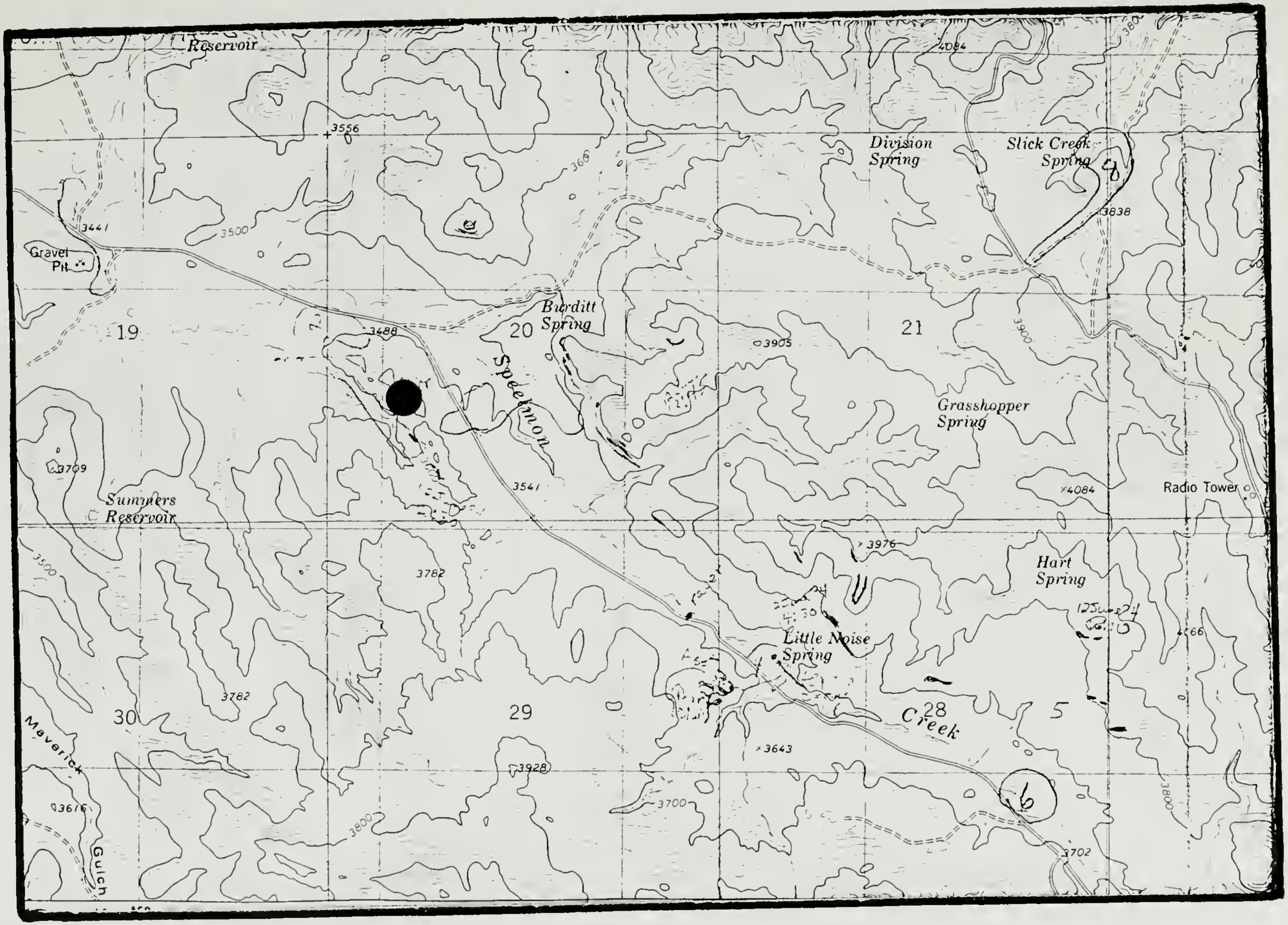
General site description:
DRY, OPEN RIDGE MIDSLOPE AT EDGE OF DISSECTED MESA. SANDSTONE AND SHALE/CLAY PARENT MATERIALS, GRAVELLY SAND SOIL. ASSOCIATED SPECIES: RHUS TRILOBATA, ORYZOPSIS HYMENOIDES, ANDROPOGON SCOPARIUS, RUMEX VENOSUS, LUPINUS PUSILLUS, IPOMOPSIS CONGESTA, TRADESCANTIA OCCIDENTALIS, PETALOSTEMON CANDIDUM, YUCCA GLAUCA, HETEROTHECA VILLOSA, ASTRAGALUS MISSOURIENSIS.

Land owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

Comments:
OBSERVED BY K. DUEHOLM.

Information source: SENSITIVE PLANT COORDINATOR, CUSTER NATIONAL
FOREST, 2602 FIRST AVENUE NORTH, P.O. BOX 2556,
BILLINGS, MT 59103.

Specimens:



PHYSARIA BRASSICOIDES.001
RUSTLER DIVIDE QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: PHYSARIA BRASSICOIDES
Common Name: DOUBLE BLADDERPOD

Global rank: G5 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PDBRA22040.002
Element occurrence type:

Survey site name: HEGGEN CREEK
EO rank:
EO rank comments:

County: CARTER

USGS quadrangle: TERRELL CREEK

Township:	Range:	Section:	TRS comments:
001N	058E	2	NE4

Precision: M
Survey date:
First observation: 1994-06-11
Last observation: 1994-07-02
Elevation: 3720 - 3770
Slope/aspect: 60% / SSE
Size (acres): 1

Location:
CA. EKALAKA HILLS. CA. 3 AIR MILES SOUTHEAST OF EKALAKA. ALONG OPEECHE ROAD, JUST EAST OF WHERE IT CROSSES HEGGEN CREEK, ON THE SOUTH FACE OF AN OPEN RIDGE ON THE NORTH SIDE OF THE ROAD.

Element occurrence data:
2 SUBPOPULATIONS, 40 PLANTS, IN FRUIT (MANY DEHISCED BY JULY 2).

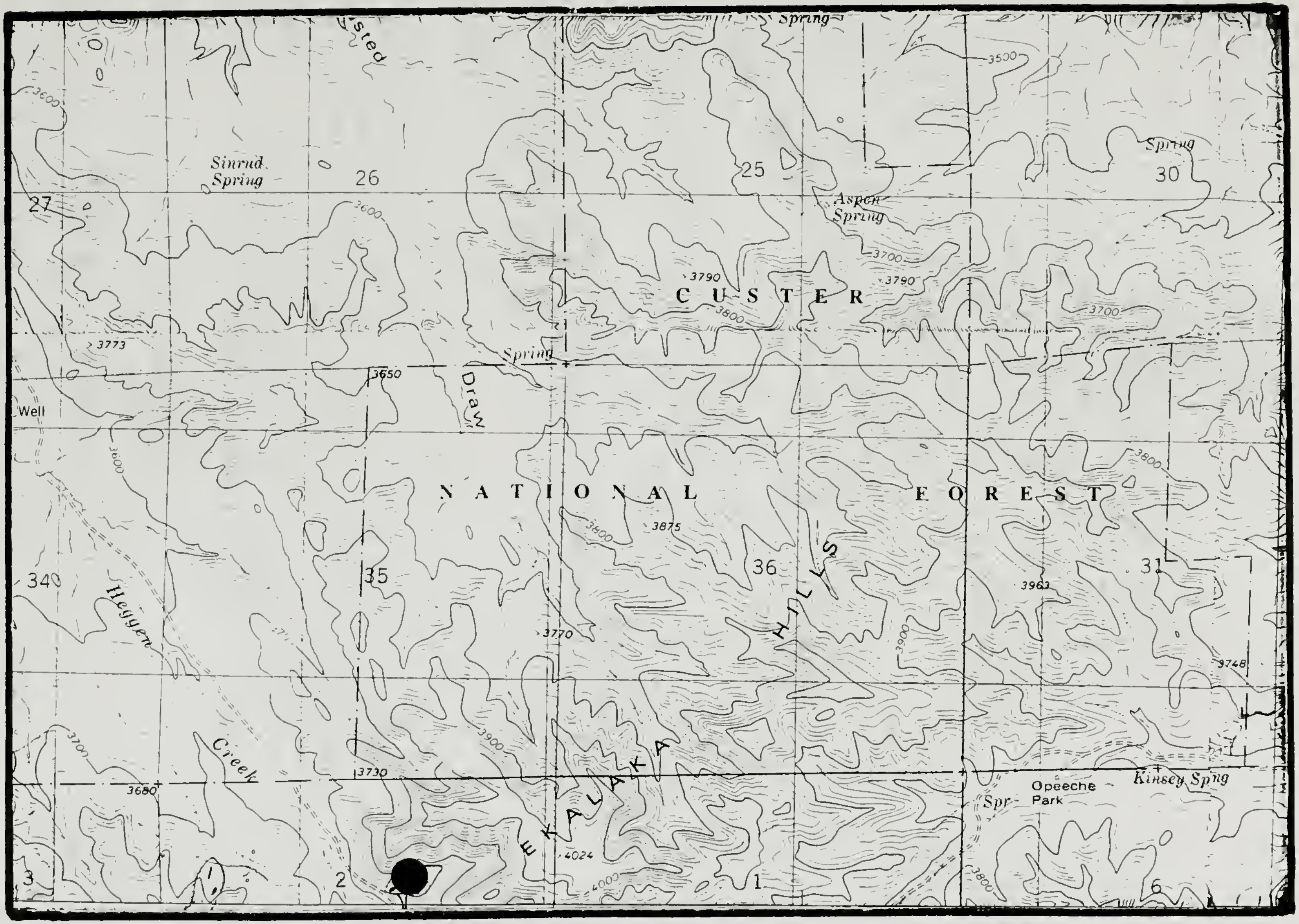
General site description:
DRY, OPEN, MID- AND LOWERSLOPE RIDGESIDE IN DISSECTED MESA. SANDSTONE PARENT MATERIAL, BROWN, GRAVELLY SAND SOIL. ASSOCIATED SPECIES: AGROPYRON SPICATUM, ANDROPOGEN SCOPARIUS, RHUS TRILOBATA, PRUNUS VIRGINIANA, AMELANCHIER ALNIFOLIA, CHAENACTIS DOUGLASII, COMANDRA UMBELLATA, LESQUERELLA ALPINA, STEPHANOMERIA RUNCINATA, ALLIUM TEXTILE, GAURA COCCINEA, PSORALEA ESCULENTA, SOLIDAGO MISSOURIENSIS.

Land owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

Comments:
OBSERVED BY K. DUEHOLM. MODERATE GRAZING NOTED.

Information source: HEIDEL, BONNIE. [BOTANIST] MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVENUE, P.O. BOX 201800, HELENA, MT 59620-1800. WORK: 406/444-3009.

Specimens: DUEHOLM, K. (12197). 1994. MONTU.



PHYSARIA BRASSICOIDES.002
TERRELL CREEK QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: PENSTEMON ANGUSTIFOLIUS
Common Name: NARROWLEAF PENSTEMON

Global rank: G5 Forest Service status:
State rank: S2 Federal Status:

Element occurrence code: PDSCR1L0C0.009
Element occurrence type:

Survey site name: PLUM CREEK
EO rank:
EO rank comments:

County: CARTER

USGS quadrangle: NORTH SLICK CREEK

Township:	Range:	Section:	TRS comments:
002S	062E	28	NW4SE4

Precision: S
Survey date: Elevation: 3420 -
First observation: 1994-06-24 Slope/aspect: 5-30% / SW
Last observation: 1994-06-24 Size (acres): 1

Location:
CA. 1.6 MILES WEST OF THE MONTANA-SOUTH DAKOTA BORDER. ON THE NORTH SIDE OF PLUM CREEK ROAD AT AN OBVIOUS BLOWOUT, NEAR THE WEST END OF A BROADSIDE VALLEY TO PLUM CREEK.

Element occurrence data:
CA. 60 PLANTS, MOST IN EARLY FRUIT; CA. 6-10 NEW SHOOTS.

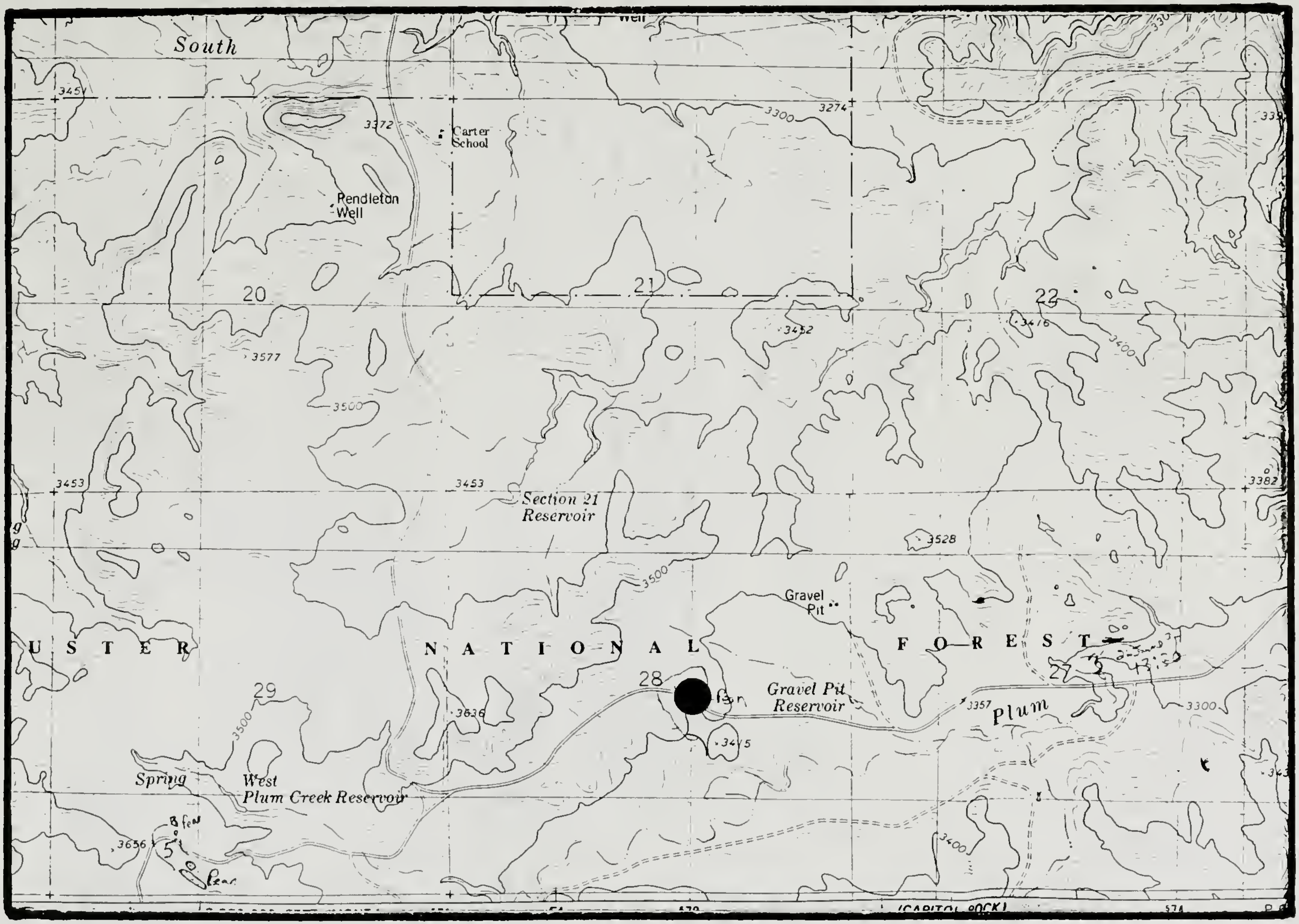
General site description:
DRY, OPEN LOWER AND MIDSLOPE HILLS WITHIN VALLEY IN DISSECTED MESA. SANDSTONE PARENT MATERIAL, BROWN SAND SOIL. ASSOCIATED SPECIES: PATCHES OF CAREX FILIFOLIA WITH BOUTELOUA GRACILIS, OCCASIONAL YUCCA GLAUCA, AND SUCH FORBS AS PETALOSTEMON PURPUREUM, ERIOGONUM ANNUUM, ARTEMISIA CAMPESTRIS. ALSO LYGODESMIA JUNCEA, OROBANCHE LUDOVICIANA, OROBANCHE FASCICULATA, LITHOSPERMUM INCISUM, ASCLEPIAS PUMILA, LESQUERELLA LUDOVICIANA, ASTRAGALUS CERAMICUS, HETEROTHECA VILLOSA.

Land owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

Comments:
OBSERVED BY K. DUEHOLM. HEAVY TRAMPLING BY CATTLE WITHIN ACTUAL BLOWOUT, BUT NOT SEVERE AT SITE.

Information source: BOTANIST, MONTANA NATURAL HERITAGE PROGRAM, 1515
EAST SIXTH AVENUE, HELENA, MT 59620-1800.

Specimens:



PENSTEMON ANGUSTIFOLIUS.009
NORTH SLICK CREEK QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: PENSTEMON ANGUSTIFOLIUS
Common Name: NARROWLEAF PENSTEMON

Global rank: G5 Forest Service status:
State rank: S2 Federal Status:

Element occurrence code: PDSCR1L0C0.010
Survey site name: WEST PLUM CREEK RESERVOIR
EO rank:
EO rank comments:
County: CARTER
USGS quadrangle: NORTH SLICK CREEK

Township:	Range:	Section:	TRS comments:
002S	062E	29	SE4SW4

Precision: S
Survey date: Elevation: 3540 - 3560
First observation: 1994-06-24 Slope/aspect: 0-15% / SW, NE, WEST
Last observation: 1994-06-24 Size (acres): 2

Location:

CA. 0.2 MILE SOUTHWEST OF WEST PLUM CREEK RESERVOIR. PARK AT CURVE IN ROAD ALONG PLUM CREEK AT THE TOP OF THE RIDGE, NORTH OF A CATTLE GUARD AND WALK SOUTHEAST CA. 150M ALONG TOP OF RIDGE TO WHERE PINES END TO PLANTS. 2ND SUBPOPULATION IS NORTH OF PARKING AREA, ALONG FENCELINE.

Element occurrence data:

2 SUBPOPULATIONS, 40 PLANTS TOTAL (13 ON RIDGE, AT LEAST 25 NORTH). ALMOST ALL IN FRUIT IN NORTHERN SUBPOPULATION. MANY DEAD STEMS FROM PREVIOUS YEAR ON RIDGE. YOUNG SHOOTS ON BLOWOUT.

General site description:

DRY, MOSTLY OPEN UPPERSLOPE RIDGES WITHIN VALLEY IN DISSECTED MESA. SANDSTONE PARENT MATERIAL, BROWN SANDY LOAM AND GRAVELLY SAND SOIL. ASSOCIATED SPECIES: CAREX FILIFOLIA WITH BOUTELOUA GRACILIS, STIPA COMATA, ANDROPOGON HALLII, WITH OCCASIONAL YUCCA GLAUCA, RHUS TRILOBATA, PSORALEA ARGOPHYLLA. ALSO KOELERIA MACRANTHA, LYGODESMIA JUNCEA, ARTEMISIA CAMPESTRIS, TRADESCANTIA OCCIDENTALIS, PSORALEA ESCULENTA, PINUS PONDEROSA.

Land owner/manager:

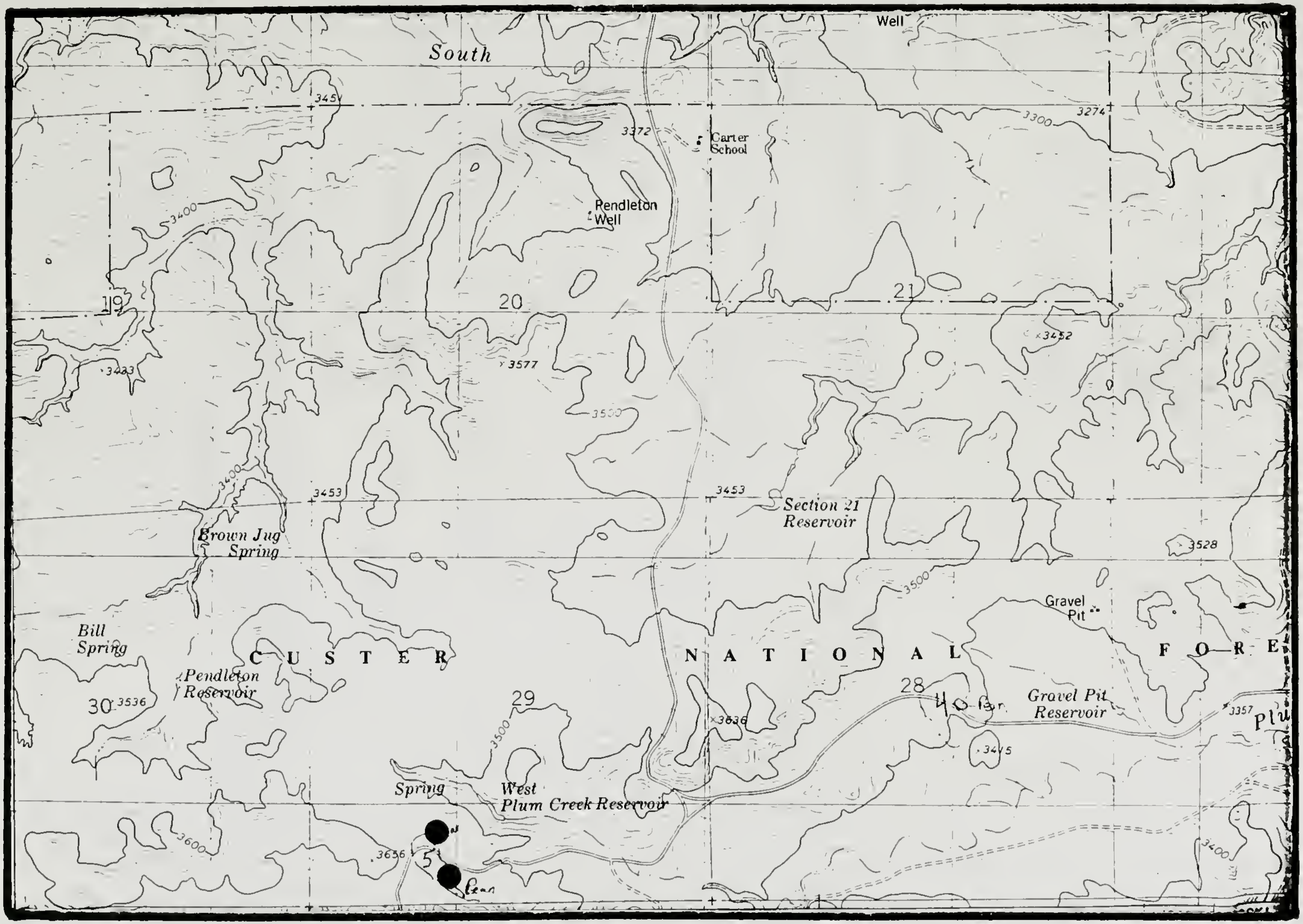
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

Comments:

OBSERVED BY K. DUEHOLM. MODERATE GRAZING NOTED. THE NORTH SUBPOPULATION LOOKS HEALTHY, BUT THE RIDGE POPULATION CONSISTS OF OLD STEMS FROM THE PREVIOUS YEAR AND A FEW BASAL OR SMALL SHOOTS IN OPEN AREAS.

Information source: SENSITIVE PLANT COORDINATOR, CUSTER NATIONAL FOREST, 2602 FIRST AVENUE NORTH, P.O. BOX 2556, BILLINGS, MT 59103.

Specimens:



PENSTEMON ANGUSTIFOLIUS.010
NORTH SLICK CREEK QUAD (7.5')

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: SPHENOPHOLIS OBTUSATA VAR MAJOR
Common Name: SLENDER WEDGEGRASS

Global rank: G5T5 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PMPOA5T031.002
Element occurrence type:

Survey site name: MCCLARY RANGER STATION
EO rank:
EO rank comments:

County: CARTER

USGS quadrangle: TIMBER HILL

Township:	Range:	Section:	TRS comments:
002S	061E	36	SW4SE4

Precision: S
Survey date: 1924-07-22 Elevation: 3680 -
First observation: 1924 Slope/aspect:
Last observation: 1924-07-22 Size (acres): 0

Location:
MCCLARY RANGE STATION YARD.

Element occurrence data:
SCARCE.

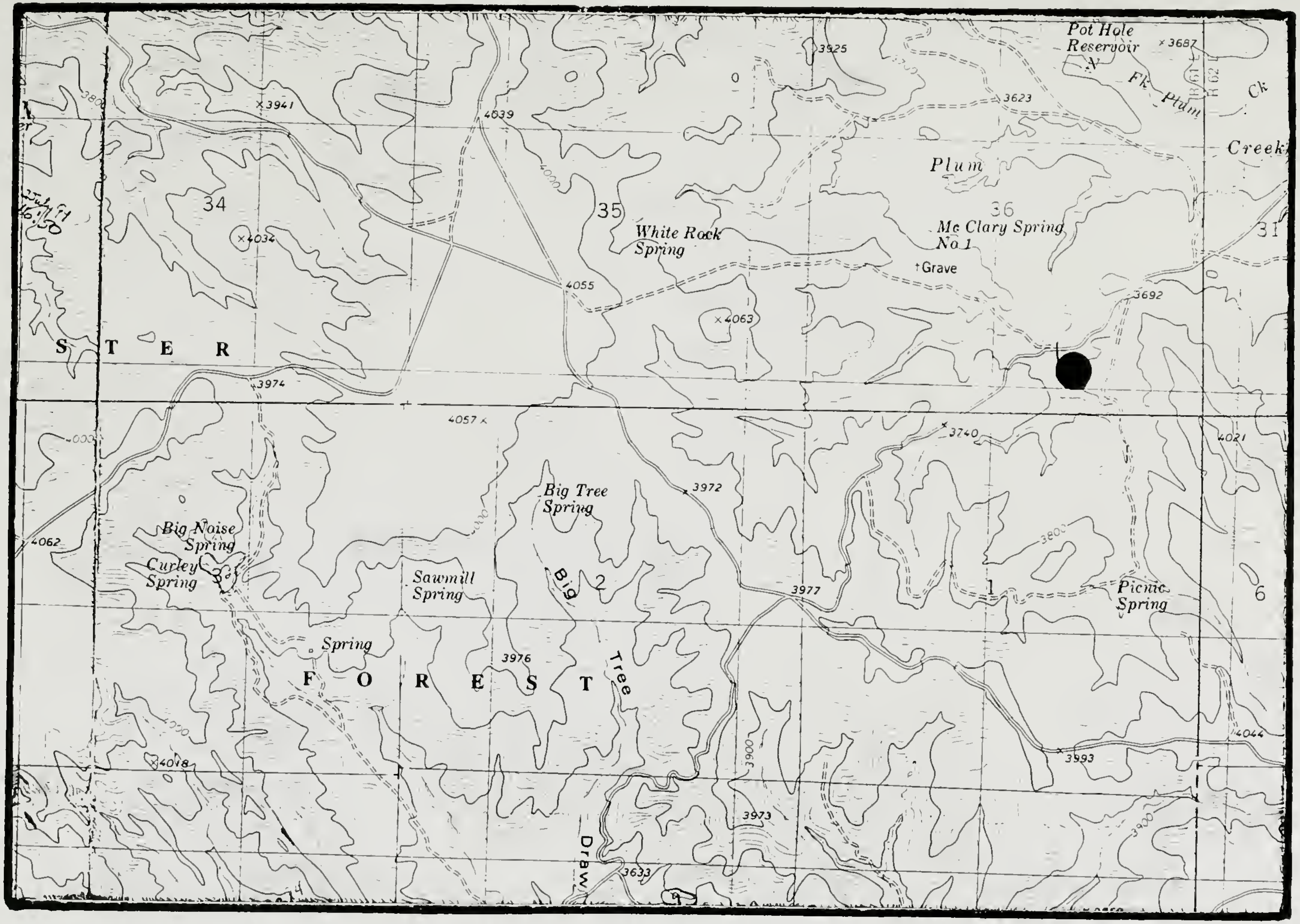
General site description:
SOUTH SLOPE. LOAM SOIL. WHEAT AND PORCUPINE GRASS.

Land owner/manager:
CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

Comments:
NONE.

Information source: BOTANIST, MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVENUE, HELENA, MT 59620-1800.

Specimens: WHITHAM, J. C. (709A). 1924. SPECIMEN #427996. RM.



SPHENOPHOLIS OBTUSATA VAR MAJOR.002
TIMBER HILL (7.5')

Appendix D (SD) EORs and maps showing precise occurrence locations in South Dakota

EOCODE: PDAST0T2B0*003*SD

South Dakota Element Occurence Record

SNAME: ASTER PAUCIFLORUS
SCOMNAME: MARSH ALKALI ASTER

IDENTITY:
PRECISION:

GRANK: G4 SRANK: SU FEDSTATUS: STATESTATUS:
SURVEYDATE: LASTOBS: 1959-07-30 FIRSTOBS: 1959 EORANK: EORANKDATE:

EORANKCOM:

SURVEYSITE: SITECODE: S.USSDHP*50

COUNTYNAME: Harding SITENAME: SOUTH CAVE HILLS

QUADNAME:	QUAD:	MARG:	DOT:	TEN:
LADNER SE	4510375	1		5,9

LAT: 454503N LONG: 1033400W N: S: E: W:

TOWNRANGE: 021N005E SECTION: MERIDIAN: BH
TRSNOTE:

MINELEV: 3400 SIZE: PHYSPROV: CT WATERSHED: 10130302 STREAMCODE: R24D00
MAXELEV:
DIRECTIONS: SOUTH CAVE HILLS CUSTER NATIONAL FOREST

GENDESC: DRY SOIL

EODATA:

COMMENTS:

SPECIMENS:

MACODE:	MANAME:	CONTAINED:
M.USSDHP*204	SOUTH CAVE HILLS	Y
M.USSDHP*376	CUSTER NATIONAL FOREST	Y

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM:

PROTCOM:

OWNER: US FOREST SERVICE OWNERINFO: Y
OWNERCOM: CUSTER NATIONAL FOREST, SOUTH CAVE HILLS

DATASENS: BOUNDARIES: PHOTOS:

BESTSOURCE: WINTER, J. 1959 SPECIMEN #58-142 SD

SOURCECODE:

TRANSCRIBR: 82-12-09 ODE CDREV: Y MAPPER: 83=01-04 ODE QC: Y DATARESP:

Insufficient location information for mapping

EOCODE: PDAST20060*001*SD

South Dakota Element Occurence Record

SNAME: CHAENACTIS DOUGLASII
SCOMNAME: DOUGLAS' DUSTY MAIDEN

IDENTITY:
PRECISION: G

GRANK: G5 SRANK: SU FEDSTATUS: STATESTATUS:
SURVEYDATE: LASTOBS: 1941-SUM FIRSTOBS: 1911 EORANK: EORANKDATE:

EORANKCOM:

SURVEYSITE:

SITECODE: S.USSDHP*21

COUNTYNAME: Harding

SITENAME: SLIM BUTTES

QUADNAME:	QUAD:	MARG:	DOT:	TEN:
J B HILL	4510342	1		5,8
IRISH BUTTE	4510332			
SHEEP MOUNTAIN	4510331			

LAT: 452353N LONG: 1031120W N: S: E: W:

TOWNRANGE: SECTION: MERIDIAN: BH
TRSNOTE:

MINELEV: 3300 SIZE: 0 PHYSPROV: CT WATERSHED: STREAMCODE: P39000
MAXELEV:
DIRECTIONS: SLIM BUTTES.

GENDESC:

EODATA:

COMMENTS:

SPECIMENS:

MACODE:	MANAME:	CONTAINED:
M.USSDHP*273	SLIM BUTTES	Y
M.USSDHP*376	CUSTER NATIONAL FOREST	Y

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM:

PROTCOM:

OWNER: USFS
OWNERCOM: CUSTER NATIONAL FOREST

OWNERINFO:

DATASENS: BOUNDARIES: PHOTOS:

BESTSOURCE: BRENCKLE,J.F.1941.SPECIMEN SD.

SOURCECODE: S41BRESDSDUS
S11VISSDSDUS
A80VAN01SDUS

TRANSCRIBR: 82-07-23 ODE CDREV: Y MAPPER: 82-10-26 ODE QC: Y DATARESP:

Insufficient location information for mapping

EOCODE: PDAST20060*002*SD

South Dakota Element Occurence Record

SNAME: CHAENACTIS DOUGLASII
SCOMNAME: DOUGLAS' DUSTY MAIDEN

IDENTITY:
PRECISION: G

GRANK: G5 SRANK: SU FEDSTATUS: STATESTATUS:
SURVEYDATE: LASTOBS: 1914 FIRSTOBS: 1914 EORANK: EORANKDATE:

EORANKCOM:

SURVEYSITE:

SITECODE:

COUNTYNAME: Harding
QUADNAME: QUAD: MARG: DOT: TEN: SITENAME:
J K BUTTE 4510348 1

LAT: 452315N LONG: 1035344W N: S: E: W:

TOWNRANGE: SECTION: MERIDIAN: BH
TRSNOTE:

MINELEV: 3920 SIZE: 0 PHYSPROV: CT WATERSHED: 10110201 STREAMCODE: T03C00
MAXELEV:
DIRECTIONS: SHORT PINE HILLS.

GENDESC:

EODATA: RARE.

COMMENTS: PAGE 64. MAY OCCUR IN CUSTER NATIONAL FOREST.

SPECIMENS:

MACODE: MANAME:

CONTAINED:

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM:

PROTCOM:

OWNER:
OWNERCOM: OWNERINFO:

DATASENS: BOUNDARIES: PHOTOS:

BESTSOURCE: VISHER,S.S.1914.A PRELIMINARY REPORT ON THE BIOLOGY OF HARD-ING CO. ... SD GEOLOGICAL SURVEY BULL.NO.6.

SOURCECODE: A14VIS02SDUS

TRANSCRIBR: 82-10-12 ODE CDREV: Y MAPPER: 82-10-26 ODE QC: Y DATARESP:

Insufficient location information for mapping

EOCODE: PDAST20060*003*SD South Dakota Element Occurence Record

SNAME: CHAENACTIS DOUGLASII IDENTITY: Y
SCOMNAME: DOUGLAS' DUSTY MAIDEN PRECISION: S

GRANK: G5 SRANK: SU FEDSTATUS: STATESTATUS:
SURVEYDATE: LASTOBS: 1994-07-09 FIRSTOBS: 1994 EORANK: EORANKDATE:

EORANKCOM:

SURVEYSITE: SITECODE:

COUNTYNAME: Harding SITENAME:

QUADNAME:	QUAD:	MARG:	DOT:	TEN:
BATTLESHIP ROCK	4510352	38		3,3

LAT: 453500N LONG: 1031230W N: S: E: W:

TOWNRANGE: 019N007E SECTION: 25 MERIDIAN: BH
TRSNOTE: N2 AND SECTION 24 SE4SW4

MINELEV: 3500 SIZE: PHYSPROV: CT WATERSHED: 10130302 STREAMCODE: B23000
MAXELEV: 3600
DIRECTIONS: SADDLE POINT TO GOVERNMENT HILL IN THE SLIM BUTTES,FROM HWY 20 AT REVA PASS, CA. 6.5 MILES NORTH ON FS ROAD #124.

GENDESC: OCCURS ON DRY, UPPER, S TO SW FACING SLOPES IN SPARSE ASSOCIATION OF AGROPYRON SPICATUM AND ANDROGOPON SCOPARIUS.

EODATA: OVER 200 INDIVIDUALS ON THREE SEPARATE PROMONTORIES WITH LOTS OF ROSETTES, IN GRAVELLY LOAM WITH ERIOGONUM FLAVUM, HYMENOXYS, ASTRAGALUS VEXILLIFLEXUS.

COMMENTS:

SPECIMENS: HEIDEL, B., 1994. #1281 (SDU,SDC)

MACODE:	MANAME:	CONTAINED:
M.USSDHP*273	SLIM BUTTES	
M.USSDHP*376	CUSTER NATIONAL FOREST	

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM:

PROTCOM:

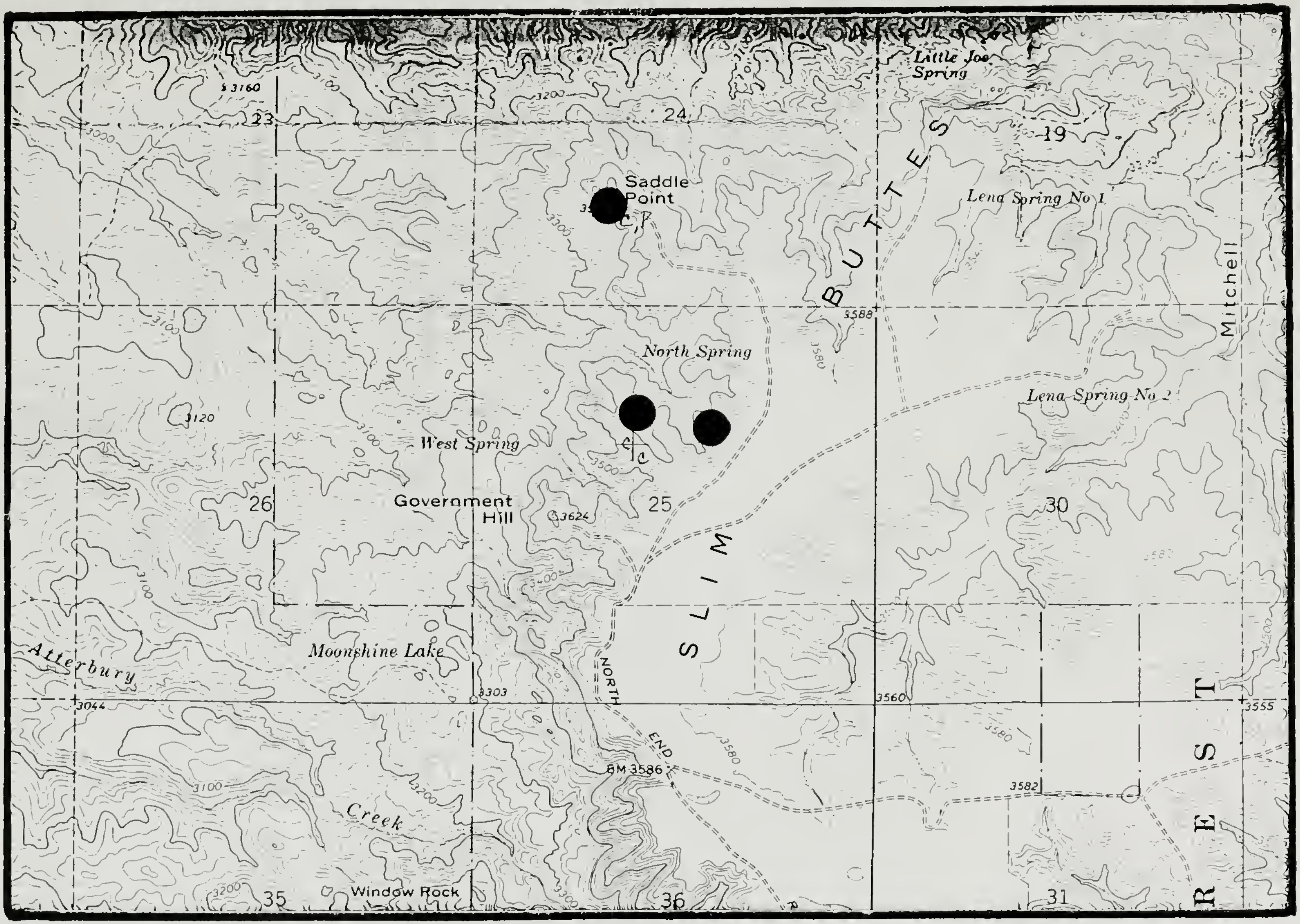
OWNER: US FOREST SERVICE OWNERINFO: Y
OWNERCOM: CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

DATASENS: BOUNDARIES: PHOTOS: Y

BESTSOURCE: HEIDEL, BONNIE, 1994. FIELD SURVEYS FOR CUSTER NATIONAL FOREST.

SOURCECODE: F94HEI01SDUS

TRANSCRIBR: 94-12-08 ODE CDREV: Y MAPPER: 94-12-08 ODE QC: Y DATARESP:



CHAENACTIS DOUGLASII.003
BATTLESHIP ROCK QUAD (7.5')

EOCODE: PDCHE091G0*001*SD South Dakota Element Occurence Record

SNAME: CHENOPODIUM SUBGLABRUM IDENTITY: Y
SCOMNAME: SMOOTH GOOSEFOOT PRECISION: G

GRANK: G2G4 SRANK: SU FEOSTATUS: STATESTATUS:
SURVEYDATE: LASTOBS: 1910-08-25 FIRSTOBS: 1910 EORANK: EORANKDATE:

EORANKCOM:

SURVEYSITE: SITECODE:

COUNTYNAME: Harding SITENAME:
QUADNAME: QUAD: MARG: DOT: TEN:
MOREAU PEAK 4510336 7 4,3

LAT: 452120N LONG: 1034155W N: S: E: W:

DEL DEL
TOWNRANGE: ~~016N003E~~ SECTION: ~~13~~ MERIDIAN: BH
TRSNOTE: NE4

MINELEV: 3700 SIZE: PHYSPROV: CT WATERSHED: 10130304 STREAMCODE: P51N00
MAXELEV:
DIRECTIONS: EAST SHORT PINE HILLS

GENDESC:

EODATA: SPECIMEN #3176 AT SDSU HERBARIUM, COLLECTED BY F.D. FROMME AND ANNOTATED BY H.A. WAHL, AUG 1966.

COMMENTS: AN UNMAPPABLE RECORD OF THIS SPECIES IS ALSO FOUND AT SDSU #3177, COLLECTED BY F.D. FROMME IN 1910,
LOCATION GIVEN ONLY AS 'CAVE HILLS' which has been annotated to C. leptophyllum (Det. B. Hei
Efforts to relocate the East Short Pine Hills collection site were made in Sections 13 and 18 in July 199
and were unsuccessful.
SPECIMENS: SDC # 3176 from East Short Pine Hills ! B. Heidel

MACODE: MANAME: CONTAINED:
M.USSDHP*376 CUSTER NATIONAL FOREST ?

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM: Most or all of potential habitat in Sand Creek watershed is outside of Custer NF boundaries
PROTCOM:

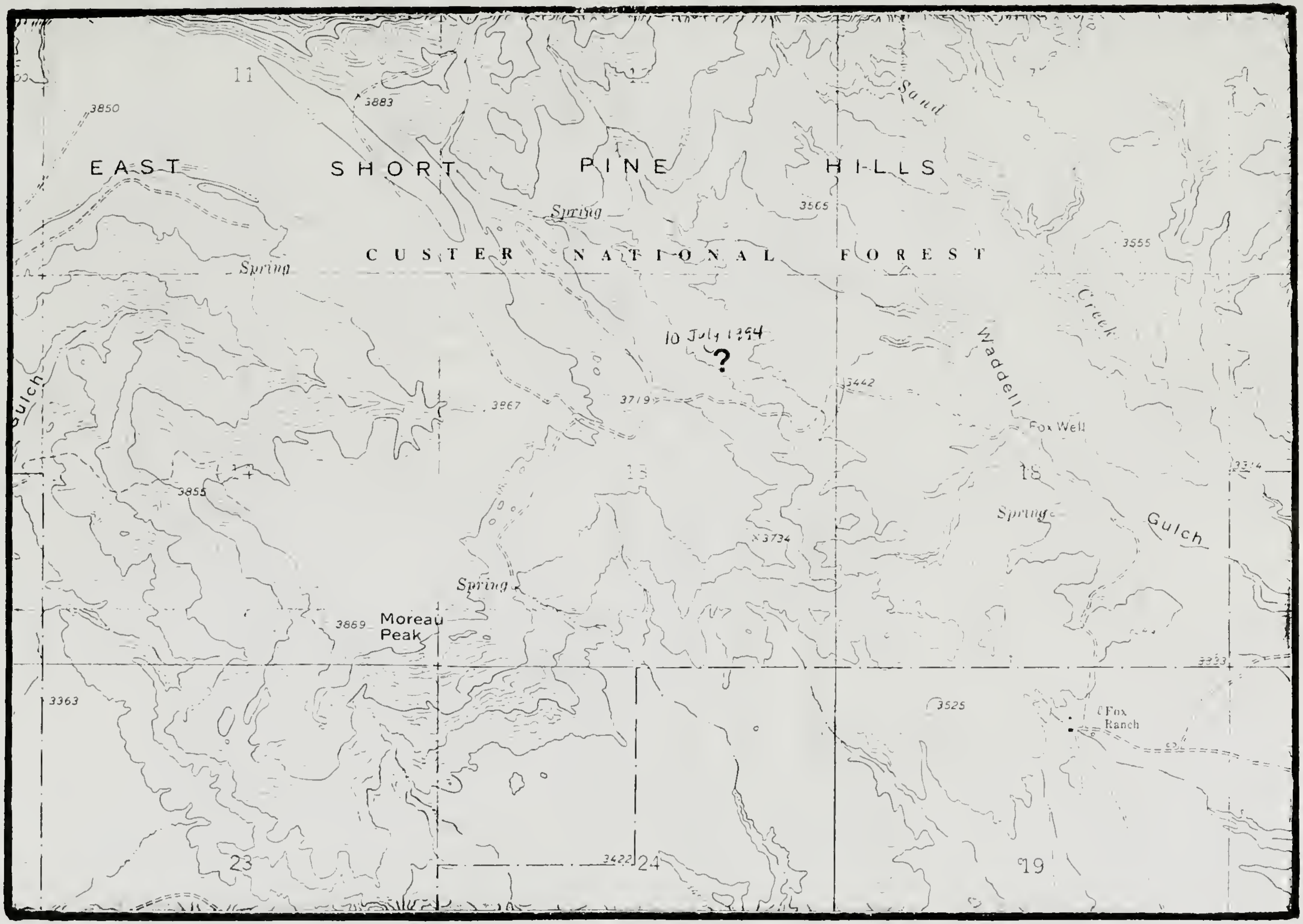
OWNER: US FOREST SERVICE OWNERINFO: Y
OWNERCOM:

DATASENS: BOUNDARIES: PHOTOS:

BESTSOURCE: SDSU HERBARIUM, 1992. BROOKINGS,SD GARY LARSON, CURATOR

SOURCECODE: 092SDS02SDUS

TRANSCRIBR: 92-05-07 DCB CDREV: Y MAPPER: 92-05-07 DCB QC: Y DATARESP:



CHENOPODIUM SUBGLABRUM.001
MOREAU PEAK QUAD (7.5')

EOCODE: PDPGN086A0*046*SD

South Dakota Element Occurence Record

SNAME: ERIOGONUM VISHERI IDENTITY: Y
SCOMNAME: DAKOTA BUCKWHEAT PRECISION: S

GRANK: G3 SRANK: S3 FEDSTATUS: C2 STATESTATUS:
SURVEYDATE: LASTOBS: 1994-07-08 FIRSTOBS: 1994 EORANK: B EORANKDATE: 1995-01-

EORANKCOM: SMALL POPULATION IN SUITABLE, REMOTE HABITAT.

SURVEYSITE: SITECODE:

COUNTYNAME: Harding SITENAME:

QUADNAME:	QUAD:	MARG:	DOT:	TEN:
IRISH BUTTE	4510332	9		6,2

LAT: 452125N LONG: 1031000W N: 452130N S: 452115N E: 1030952W W: 1031010W

TOWNRANGE: 016N008E SECTION: 08 MERIDIAN: BH
TRSNOTE: SW4SE4; SEC. 17 NW4NE4

MINELEV: 3020 SIZE: PHYSPROV: CT WATERSHED: 10130302 STREAMCODE: P52D00
MAXELEV: 3050
DIRECTIONS: SLIM BUTTES, .1 MILE WEST OF HWY 79, .5 MILE NORTH OF FOREST SERVICE BOUNDARY (DUE WEST OF "NO PASSING" SIGN FOR N-BOUND LANE).

GENDESC: BADLANDS SLOPES AND OUTWASH IN A RESTRICTED AREA WHERE TWO WATERCOURSES CONVERGE.

EODATA: CA. 1000 PLANTS ON A CLAYEY SILT OUTCROPS AND SANDY SILT OUTWASH WITH LIMONITE COBBLES, DISTICHLIS, ERIOGONUM PAUCIFLORUM, ATRIPLEX DIOICA, IVA AXILLARIS.

COMMENTS: 1993 PLANTS (A WET YEAR) WERE 50% TALLER, MORE ABUNDANT, AND HIGHER ON THE SLOPES.

SPECIMENS: HEIDEL, B. #1276 (SDU,SDS).

MACODE:	MANAME:	CONTAINED:
M.USSDHP*273	SLIM BUTTES	
M.USSDHP*376	CUSTER NATIONAL FOREST	

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM: AREA IS GRAZED BY LIVESTOCK WITH SOME RELATED MORTALITY IN 1994.

PROTCOM:

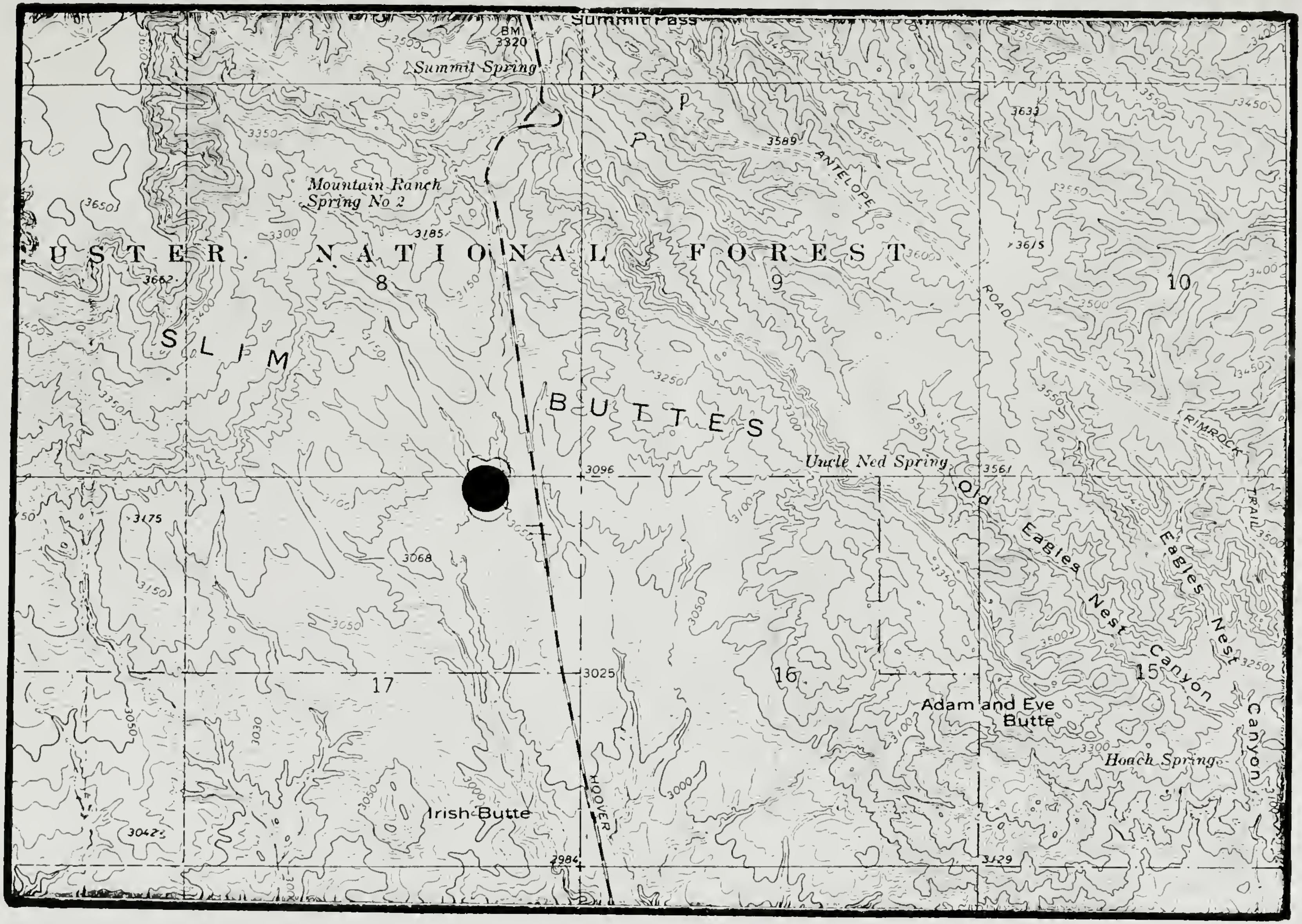
OWNER: US FOREST SERVICE OWNERINFO: Y
OWNERCOM: CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

DATASENS: BOUNDARIES: PHOTOS: Y

BESTSOURCE: HEIDEL, BONNIE, 1994. FIELD SURVEY TO HARDING COUNTY, SD.

SOURCECODE: F94HEI01SDUS

TRANSCRIBR: 95-01-09 ODE CDREV: Y MAPPER: 95-01-11 ODE QC: Y DATARESP:



ERIOGONUM VISHERI.046
IRISH BUTTE QUAD (7.5')

EOCODE: PMPOA2V0H0*001*SD South Dakota Element Occurence Record

SNAME: FESTUCA IDAHOENSIS IDENTITY:
SCOMNAME: IDAHO FESCUE PRECISION: S

GRANK: G5 SRANK: SU FEDSTATUS: STATESTATUS:
SURVEYDATE: LASTOBS: 1982-06 FIRSTOBS: 1982 EORANK: EORANKDATE:

EORANKCOM:

SURVEYSITE: SITECODE: S.USSDHP*62

COUNTYNAME: Harding SITENAME: NORTH CAVE HILLS

QUADNAME:	QUAD:	MARG:	DOT:	TEN:
LUDLOW	4510374	1		

LAT: 454804N LONG: 1032711W N: 454810N S: 454800N E: 1032705W W: 1032720W

TOWNRANGE: 021N005E SECTION: 12 MERIDIAN: BH
TRSNOTE: NW4

MINELEV: 3540 SIZE: 5 PHYSPROV: CT WATERSHED: 10130302 STREAMCODE: R24E01
MAXELEV:
DIRECTIONS: THE DAVIS DRAW AREA OF THE NORTH CAVE HILLS NEAR DAVIS DRAW RESERVOIR.

GENDESC: A SANDSTONE BUTTE TOP WITH ANDROPOGON GERARDI, PINUS PONDEROSA, POA SANDBERGII, AGROPYRON SPICATUM, AGROPYRON SMITHII, STIPA VIRIDULA, PRUNUS VIRGIN.

EODATA:

COMMENTS: APPARENTLY INACCESSIBLE TO DOMESTIC HERBIVORES. SIZE 5-10 ACRES.

SPECIMENS:

MACODE:	MANAME:	CONTAINED:
M.USSDHP*99	NORTH CAVE HILLS	Y
M.USSDHP*376	CUSTER NATIONAL FOREST	Y

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM:

PROTCOM:

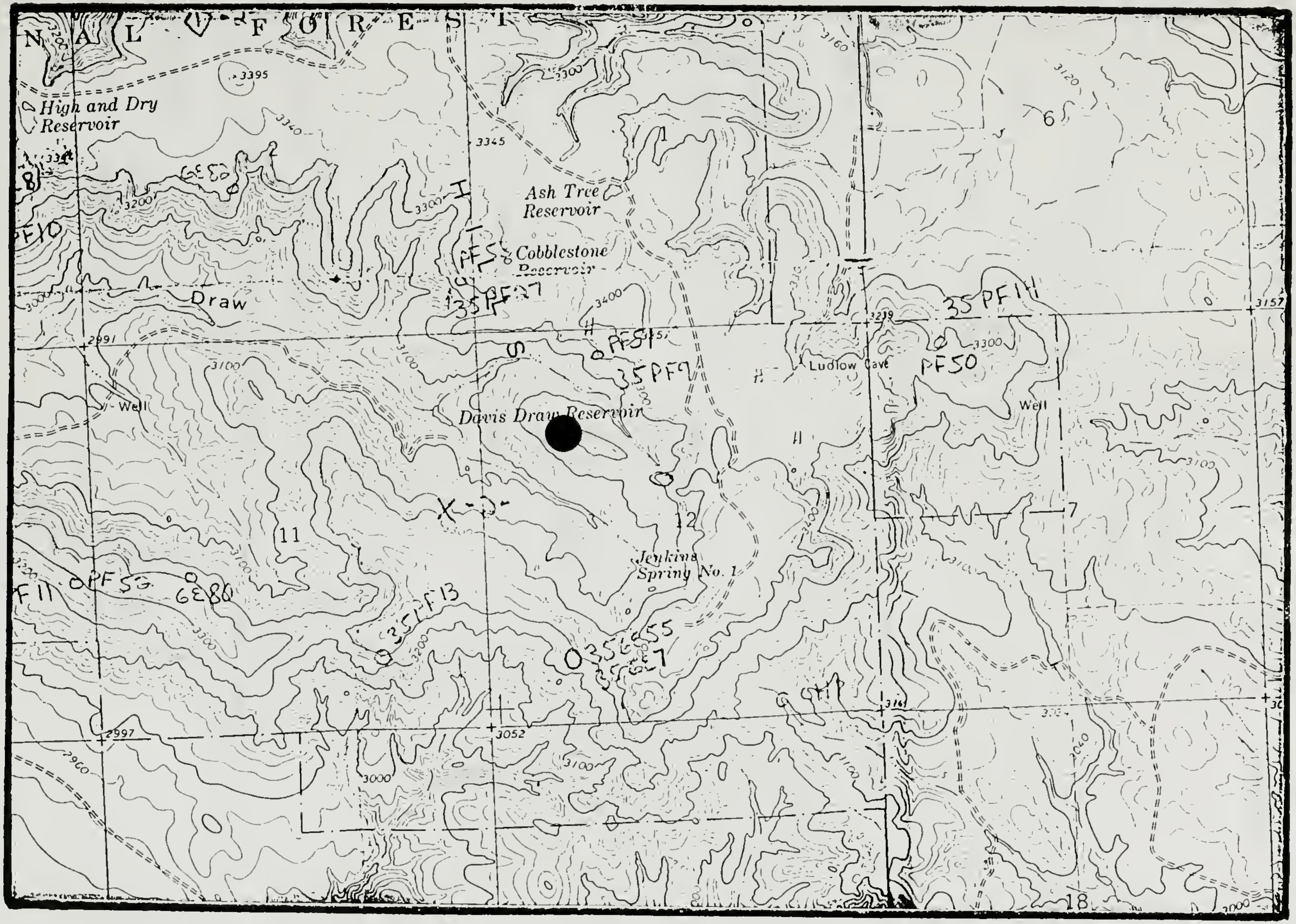
OWNER: USDA FOREST SERVICE OWNERINFO: Y
OWNERCOM: CUSTER NATIONAL FOREST, NORTH CAVE HILLS

DATASENS: BOUNDARIES: Y PHOTOS:

BESTSOURCE: JOHNSON,JANET.820823. PHONE CONVERSATION.

SOURCECODE: U82JOH01SOUS

TRANSCRIBR: 82-08-23 ODE CDREV: Y MAPPER: 82-09-01 ODE QC: Y DATARESP:



FESTUCA IDAHOENSIS.001
LUDLOW QUAD (7.5')

EOCODE: PDGEN06010*001*SD

South Dakota Element Occurence Record

SNAME: GENTIANA AFFINIS
SCOMNAME: NORTHERN GENTIAN

IDENTITY: Y
PRECISION: U

GRANK: G5 SRANK: S2 FEDSTATUS: STATESTATUS:
SURVEYDATE: LASTOBS: 1910-08-05 FIRSTOBS: 1910 EORANK: EORANKDATE:

EORANKCOM:

SURVEYSITE: SITECODE:

COUNTYNAME: Harding SITENAME:
QUADNAME: QUAD: MARG: DOT: TEN:
0

LAT: LONG: N: S: E: W:

TOWNRANGE: SECTION: MERIDIAN: BH
TRSNOTE:

MINELEV: SIZE: 0 PHYSPROV: CT WATERSHED: STREAMCODE: 000000
MAXELEV:
DIRECTIONS: CAVE HILLS.

GENDESC:

EODATA: "ABUNDANT ALONG BROOKS."

COMMENTS: PAGE 56. SPECIMEN ANNOT. AS VAR.AFFINIS BY C.T.MASON,JR., 1960.

SPECIMENS:

MACODE: MANAME: CONTAINED:

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM:

PROTCOM:

OWNER: OWNERINFO:
OWNERCOM:

DATASENS: BOUNDARIES: PHOTOS:

BESTSOURCE: VISHER,S.S.1914.A PRELIMINARY REPORT ON THE BIOLOGY OF HARDING CO. NORTHWESTERN SD. SD GEOLOGICAL SURVEY BULL. NO.6

SOURCECODE: A14VIS02SDUS
S10VISRMSDUS

TRANSCRIBR: 82-10-11-ODE CDREV: Y MAPPER: QC: Y DATARESP:

Insufficient location information for mapping

EOCODE: PDBORON070*001*SD

South Dakota Element Occurence Record

SNAME: MERTENSIA CILIATA
SCOMNAME: MOUNTAIN BLUEBELLS

IDENTITY:
PRECISION: G

GRANK: G5 SRANK: S1 FEDSTATUS: STATESTATUS:
SURVEYDATE: LASTOBS: 1912 FIRSTOBS: 1912 EORANK: EORANKDATE:

EORANKCOM:

SURVEYSITE:

SITECODE:

COUNTYNAME: Harding

SITENAME:

QUADNAME:	QUAD:	MARG:	DOT:	TEN:
J K BUTTE	4510348	2		6,7

LAT: 452420N LONG: 1035505W N: S: E: W:

TOWNRANGE: 017N002E SECTION: MERIDIAN: BH
TRSNOTE:

MINELEV: SIZE: 0 PHYSPROV: CT WATERSHED: 10110201 STREAMCODE:
MAXELEV:

DIRECTIONS: WEST SHORT PINES, 18MI. W AND 13 MI. S OF BUFFALO.

GENDESC:

EODATA: RARE

COMMENTS: P.58. LISTED AS "M. PANICULATA". NO SPECIMENS HAVE BEEN FOUND IN SD. CHECH RM.

SPECIMENS:

MACODE: MANAME: CONTAINED:

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM:

PROTCOM:

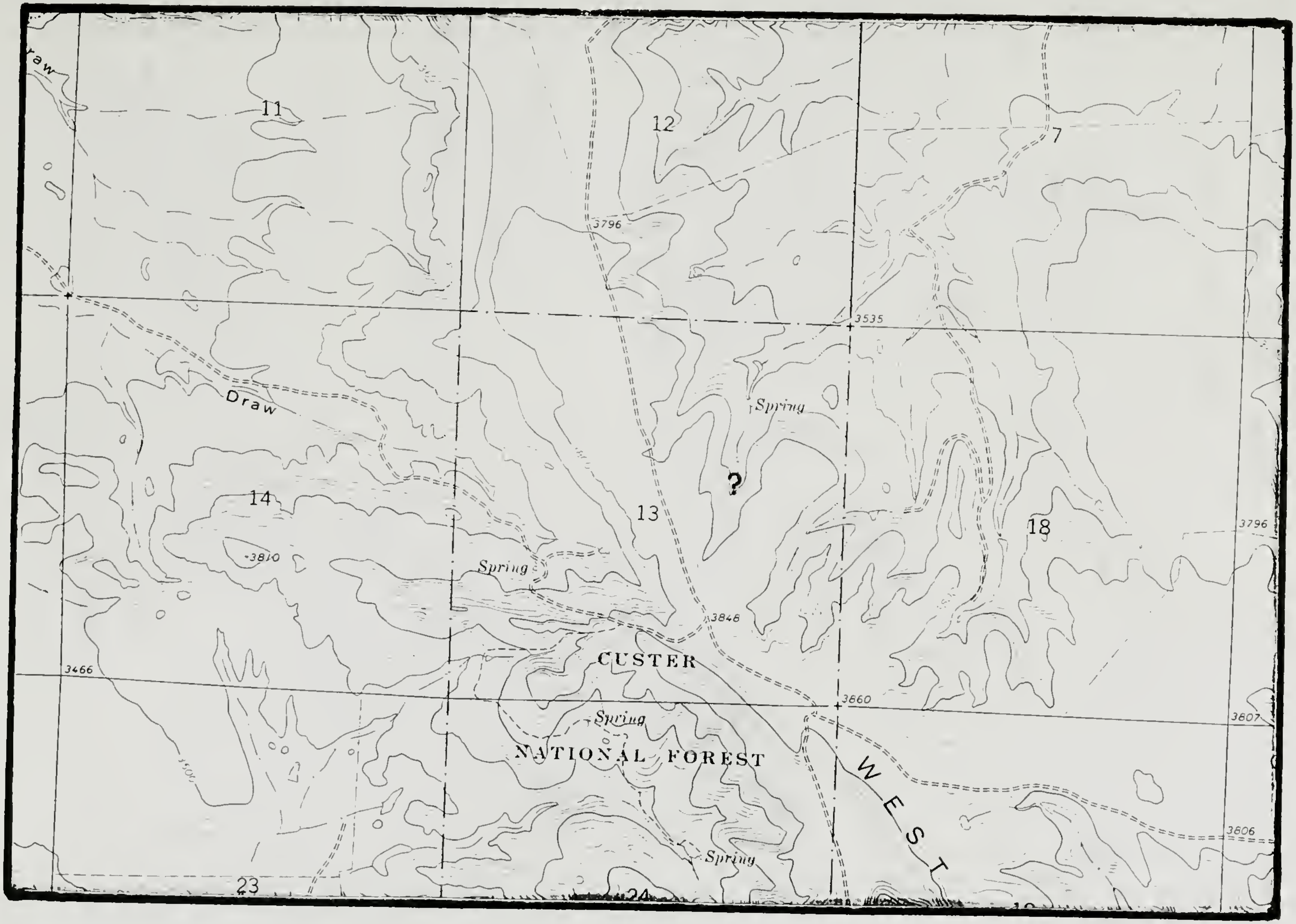
OWNER:
OWNERCOM: OWNERINFO:

DATASENS: BOUNDARIES: PHOTOS:

BESTSOURCE: VISHER, S.S. 1914. A PRELIMINARY REPORT ON THE BIOLOGY OF HARDING CO., SD GEOLOGICAL SURVEY BULLETIN # 6..

SOURCECODE: A14VIS02SDUS

TRANSCRIBR: 87-02-14 ODE CDREV: Y MAPPER: 87-02-16 GAS QC: DATARESP:



MERTENSIA CILIATA.001
JK BUTTE QUAD (7.5')

EOCODE: PDBORON070*002*SD South Dakota Element Occurence Record

SNAME: MERTENSIA CILIATA IDENTITY: Y
SCOMNAME: MOUNTAIN BLUEBELLS PRECISION: S

GRANK: G5 SRANK: S1 FEDSTATUS: STATESTATUS:
SURVEYDATE: LASTOBS: 1986-05-31 FIRSTOBS: 1986 EORANK: B EORANKDATE:

EORANKCOM: VIABLE POPULATION IN SUITABLE HABITAT

SURVEYSITE: SITECODE: S.USSDHP*21

COUNTYNAME: Harding SITENAME: SLIM BUTTES

QUADNAME:	QUAD:	MARG:	DOT:	TEN:
J B HILL	4510342	7		5,2

LAT: 452855N LONG: 1031053W N: S: E: W:

TOWNRANGE: 018N008E SECTION: 31 MERIDIAN: BH
TRSNOTE: S2NE4

MINELEV: SIZE: 20 PHYSPROV: CT WATERSHED: 10130302 STREAMCODE:
MAXELEV:
DIRECTIONS: TEPEE CANYON IN THE SLIM BUTTES, 17.5 MI. E AND 7 MI. S OF BUFFALO.

GENDESC: STEEP N-FACING PINE FOREST.

EODATA: OCCASIONAL IN 80% SHADE. ASSOC. WITH CYSTOPTERIS FRAGILIS, ELYMUS VILLOSUS, GALIUM BOREALE, PRUNUS VIRGINIANA & FRAXINUS SEEDLINGS.

COMMENTS: SEE ODE'S FIELD NOTES FOR DOCUMENTATION.

SPECIMENS:

MACODE:	MANAME:	CONTAINED:
M.USSDHP*273	SLIM BUTTES	Y
M.USSDHP*376	CUSTER NATIONAL FOREST	Y

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM: AREA IS BEING GRAZED BY CATTLE.

PROTCOM:

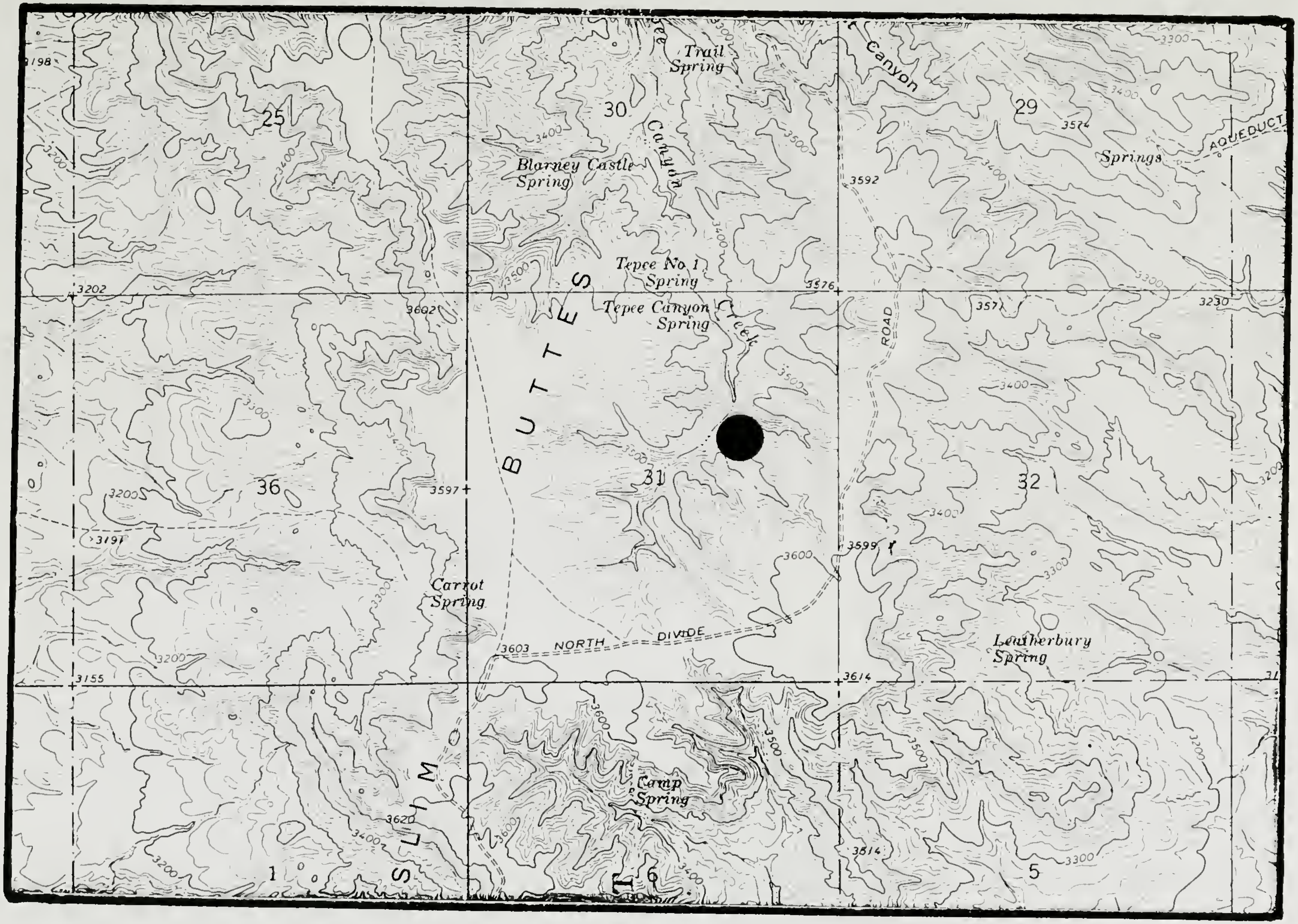
OWNER: US FOREST SERVICE OWNERINFO:
OWNERCOM:

DATASENS: BOUNDARIES: PHOTOS:

BESTSOURCE: ODE, D.J. 1986. SPECIMEN # 86-20 SS.

SOURCECODE: S86ODESSSDUS

TRANSCRIBR: 87-02-15 ODE CDREV: Y MAPPER: 87-02-16 GAS QC: DATARESP:



MERTENSIA CILIATA.C02
JB HILL QUAD (7.5')

EOCODE: PDSCR1L490*002*SD

South Dakota Element Occurence Record

SNAME: PENSTEMON NITIDUS
IDENTITY: Y
SCOMNAME: SHINING PENSTEMON
PRECISION: S

GRANK: G5 SRANK: SU FEDSTATUS: STATESTATUS:
SURVEYDATE: 1986-05-28 LASTOBS: 1994-07-09 FIRSTOBS: 1986 EORANK: B EORANKDATE:

EORANKCOM: VIABLE POPULATION IN SUITABLE HABITAT

SURVEYSITE:
SITECODE: S.USSDHP*21

COUNTYNAME: Harding
SITENAME: SLIM BUTTES

QUADNAME:	QUAD:	MARG:	DOT:	TEN:
BATTLESHIP ROCK	4510352	4		3,3

LAT: 453450N LONG: 1031235W N: 453500N S: 453430N E: 1031225W W: 1031300W

TOWNRANGE: 019N007E SECTION: 25 MERIDIAN: BH
TRSNOTE: N2SW4, SW4NE4;SEC.24 SE4SW4.

MINELEV: 3550 SIZE: 40 PHYSPROV: CT WATERSHED: 10130302 STREAMCODE: R26A01
MAXELEV:
DIRECTIONS: GOVERNMENT HILL, SADDLE PONT, AND INTERMEDIATE PROMONTORY IN THE SLIM BUTTES, 16 MI E OF BUFFALO.

GENDESC: LOCATED ON MOSTLY BARREN ROCKY RIDGES AND TALUS SLOPES AT SEVERAL PLACES AROUND GOVERNMENT HILL.

EODATA: SEVERAL HUNDRED PLANTS OBSERVED IN WHITE, ROCKY SUBSTRATE. ASSOC. WITH CAREX FILIFOLIA, SENECIO CANUS, JUNIPERUS HORIZONTALIS, ARTEMISIA FRIGIDA, & LESQUERELLA ALPINA, WITH SMALL OUTLYING SUBPOPULATIONS TO NORTHEAST.

COMMENTS:

SPECIMENS: SPECIMEN COLLECTED: ODE #86-7 (SDC,SDU)

MACODE:	MANAME:	CONTAINED:
M.USSDHP*273	SLIM BUTTES	Y
M.USSDHP*376	CUSTER NATIONAL FOREST	Y

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM:

PROTCOM:

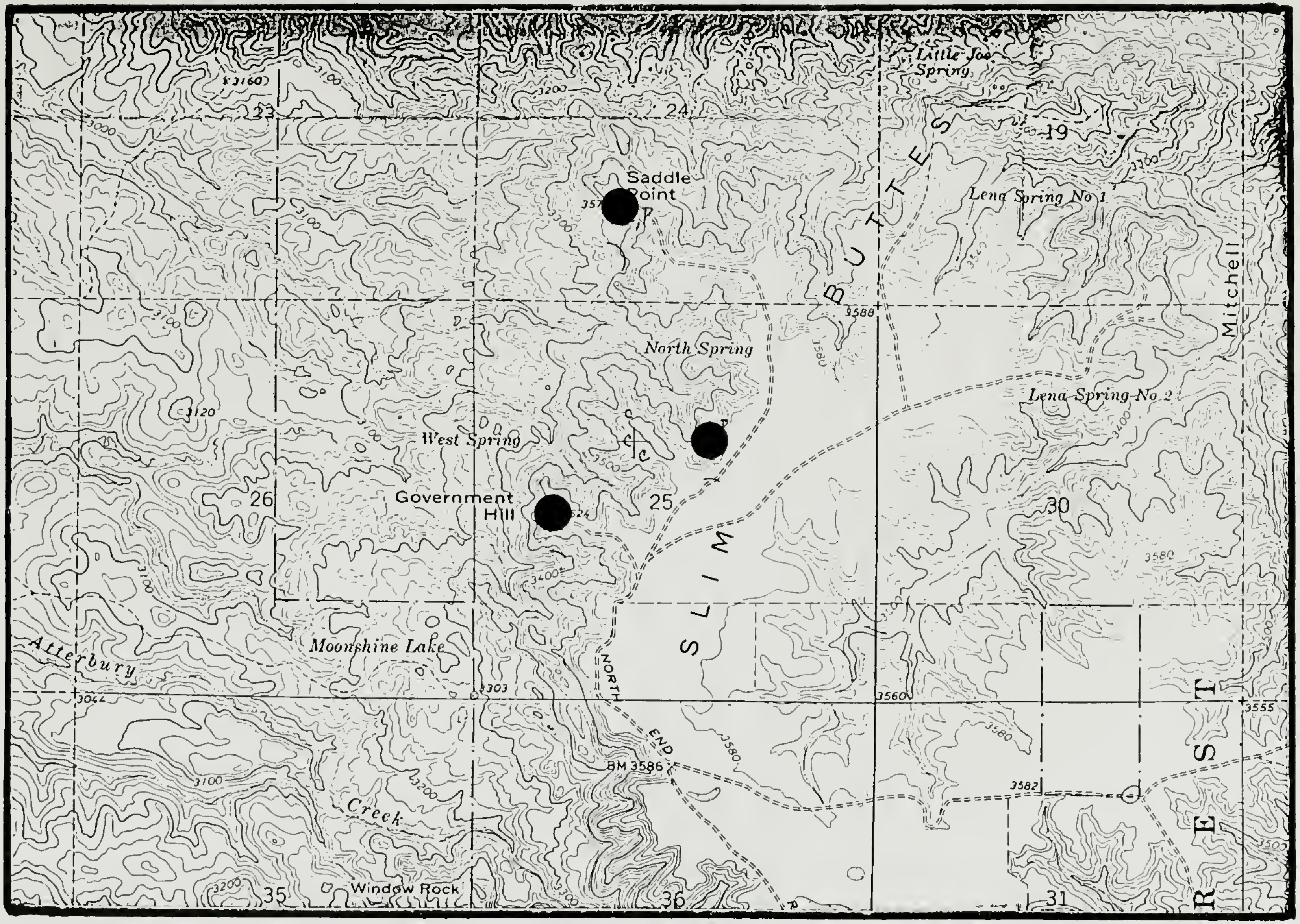
OWNER: US FOREST SERVICE
OWNERINFO: Y
OWNERCOM: CUSTER NATIONAL FOREST, SIOUX DISTRICT

DATASENS: BOUNDARIES: Y PHOTOS: Y

BESTSOURCE: ODE, D.J. 1986. FIELD SURVEY TO GOVRNMENT HILL OF 28 MAY.

SOURCECODE: F86ODE03SDUS
F94HEI01SDUS

TRANSCRIBR: 86-06-06 ODE CDREV: Y MAPPER: 86-06-06 ODE QC: Y DATARESP:



PENSTEMON NITIDUS.002
BATTLESHIP ROCK QUAD (7.5')

EOCODE: PDSCR1L490*003*SD

South Dakota Element Occurence Record

SNAME: PENSTEMON NITIDUS IDENTITY: Y
SCOMNAME: SHINING PENSTEMON PRECISION: S

GRANK: G5 SRANK: SU FEDSTATUS: STATESTATUS:
SURVEYDATE: LASTOBS: 1994-07-07 FIRSTOBS: 1994 EORANK: EORANKDATE:

EORANKCOM:

SURVEYSITE: SITECODE:

COUNTYNAME: Harding SITENAME:

QUADNAME:	QUAD:	MARG:	DOT:	TEN:
IRISH BUTTE	4510332	10		7,1
J B HILL	4510342			

LAT: 452216N LONG: 1030940W N: 452230N S: 452205N E: 1030925W W: 1030950W

TOWNRANGE: 016N008E SECTION: 09 MERIDIAN: BH
TRSNOTE: NW4NW4;SECTION 4 AND 5.

MINELEV: 3420 SIZE: PHYSPROV: CT WATERSHED: 10130302 STREAMCODE: P52D02
MAXELEV: 3520
DIRECTIONS: SLIM BUTTES, EAST OF HWY 79, AT SUMMIT PASS AND ALONG ANTELOPE ROAD.

GENDESC: OCCURRING ON S-FACING, 10-40% SLOPES BELOW RIDGES AND ABOVE A SERIES OF EAST-WEST RUNNING DRAINAGES.

EODATA: FEWER THEN 50 PLANTS SCATTERED ON 5 DIFFERENT SLOPES IN EARLY SUCCESSIONAL ARTEMISIA CANA/CAREX FILIFOLIA COMMUNITY WITH ANDROPOGON SCOPARIUS, RHUS TRILOPATA, MENTZELIA, PSORALEA ESCULENTA.

COMMENTS: 50% OF THE PLANTS IN ROSETTE STAGE. NO POTENTIAL HABITAT WEST OF HIGHWAY 79, LOTS OF APPARENT, UNOCCUPIED HABITAT EAST OF HIGHWAY 79.

SPECIMENS: HEIDEL,B. 1994. #1275 (SDU).

MACODE:	MANAME:	CONTAINED:
M.USSDHP*273	SLIM BUTTES	
M.USSDHP*376	CUSTER NATIONAL FOREST	

MORELAND: MOREPROT: MOREMGMT: TNCINVOLVE:
MGMTCOM:

PROTCOM:

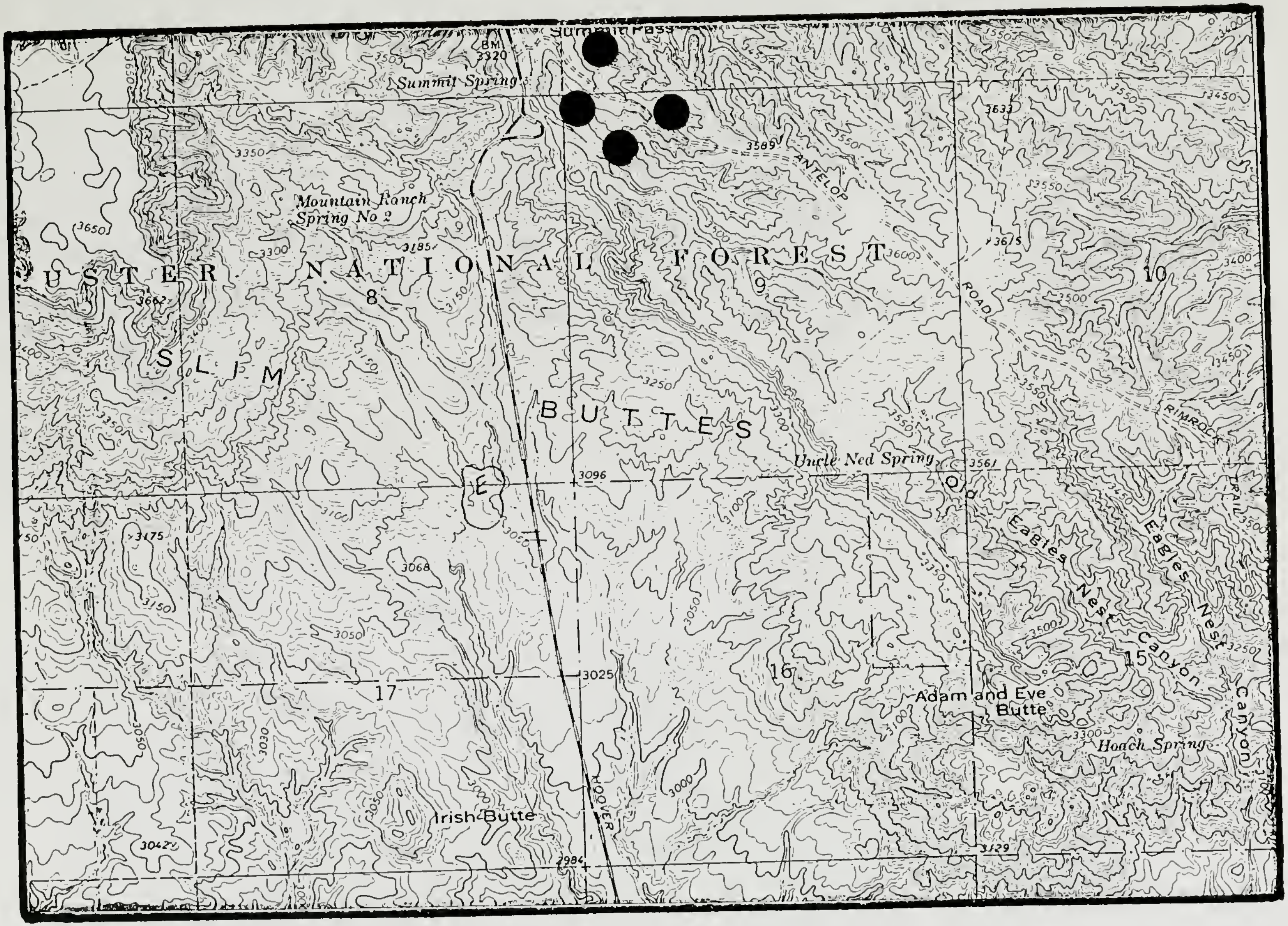
OWNER: US FOREST SERVICE OWNERINFO: Y
OWNERCOM: CUSTER NATIONAL FOREST, SIOUX RANGER DISTRICT

DATASENS: BOUNDARIES: PHOTOS:

BESTSOURCE: HEIDEL, BONNIE, 1994. FIELD SURVEY TO HARDING COUNTY, SD.

SOURCECODE: F94HEI01SDUS

TRANSCRIBR: 94-01-09 ODE CDREV: Y MAPPER: 94-01-09 ODE QC: Y DATARESP:



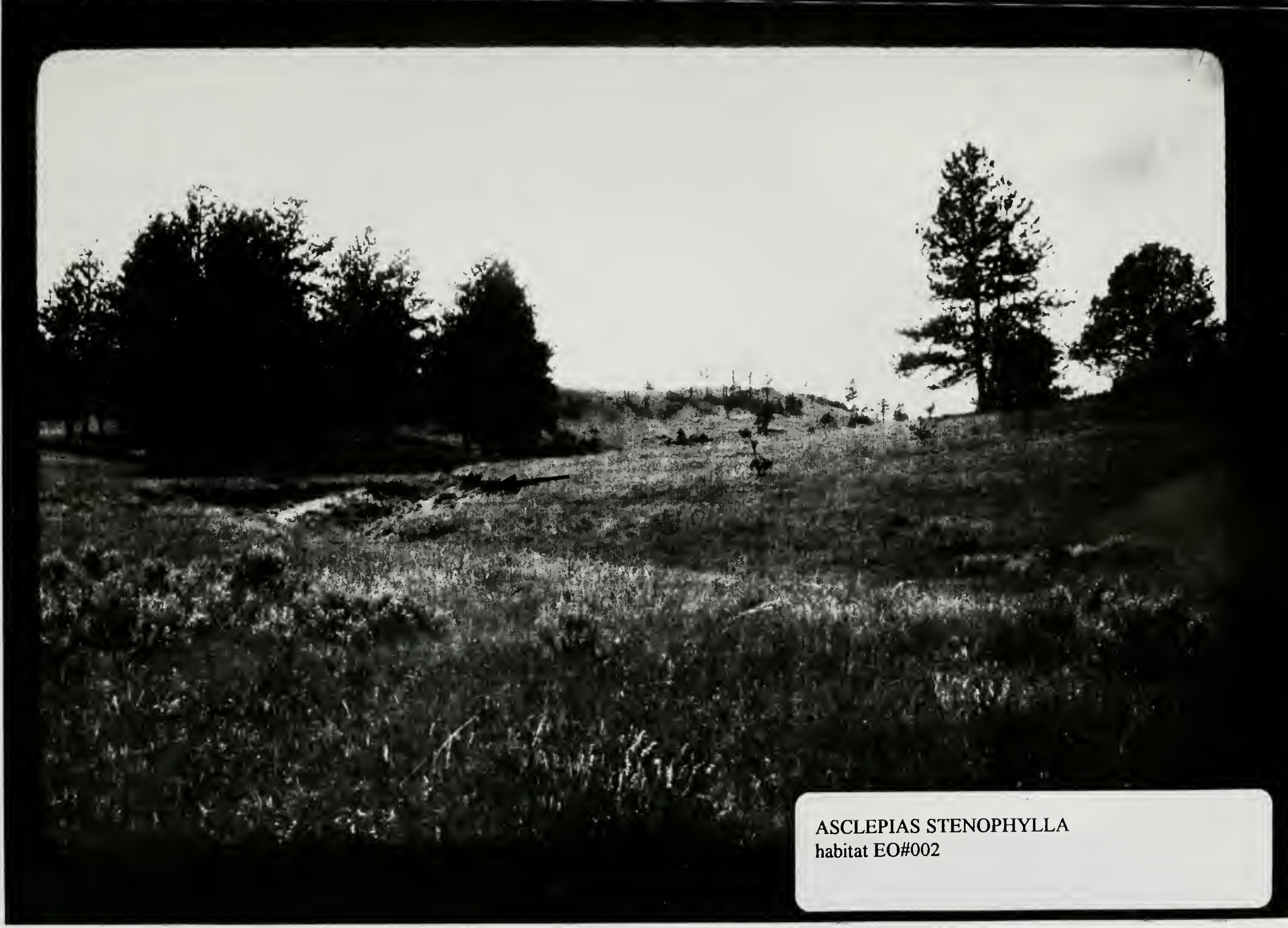
PENSTEMON NITIDUS.003
IRISH BUTTE QUAD (7.5')

Appendix E (MT) Close-up and habitat photographs (Montana)

ASCLEPIAS OVALIFOLIA
close-up

ASCLEPIAS OVALIFOLIA
habitat EO#001

ASCLEPIAS STENOPHYLLA
close-up



ASCLEPIAS STENOPHYLLA
habitat EO#002

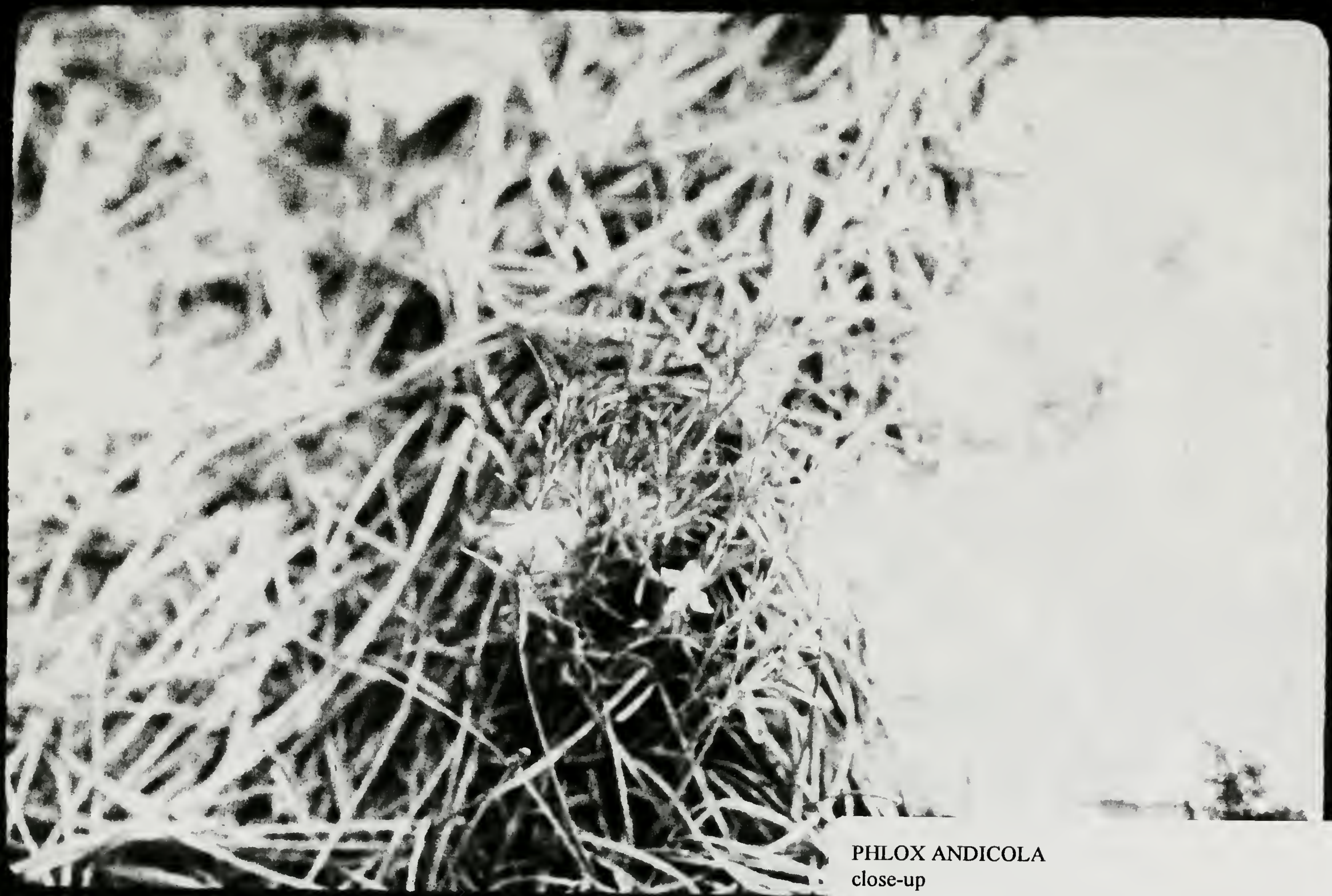
CAREX TORREYI
close-up

CAREX TORREYI
whole plant

DICHANTHELIUM WILCOXIANUM
close-up

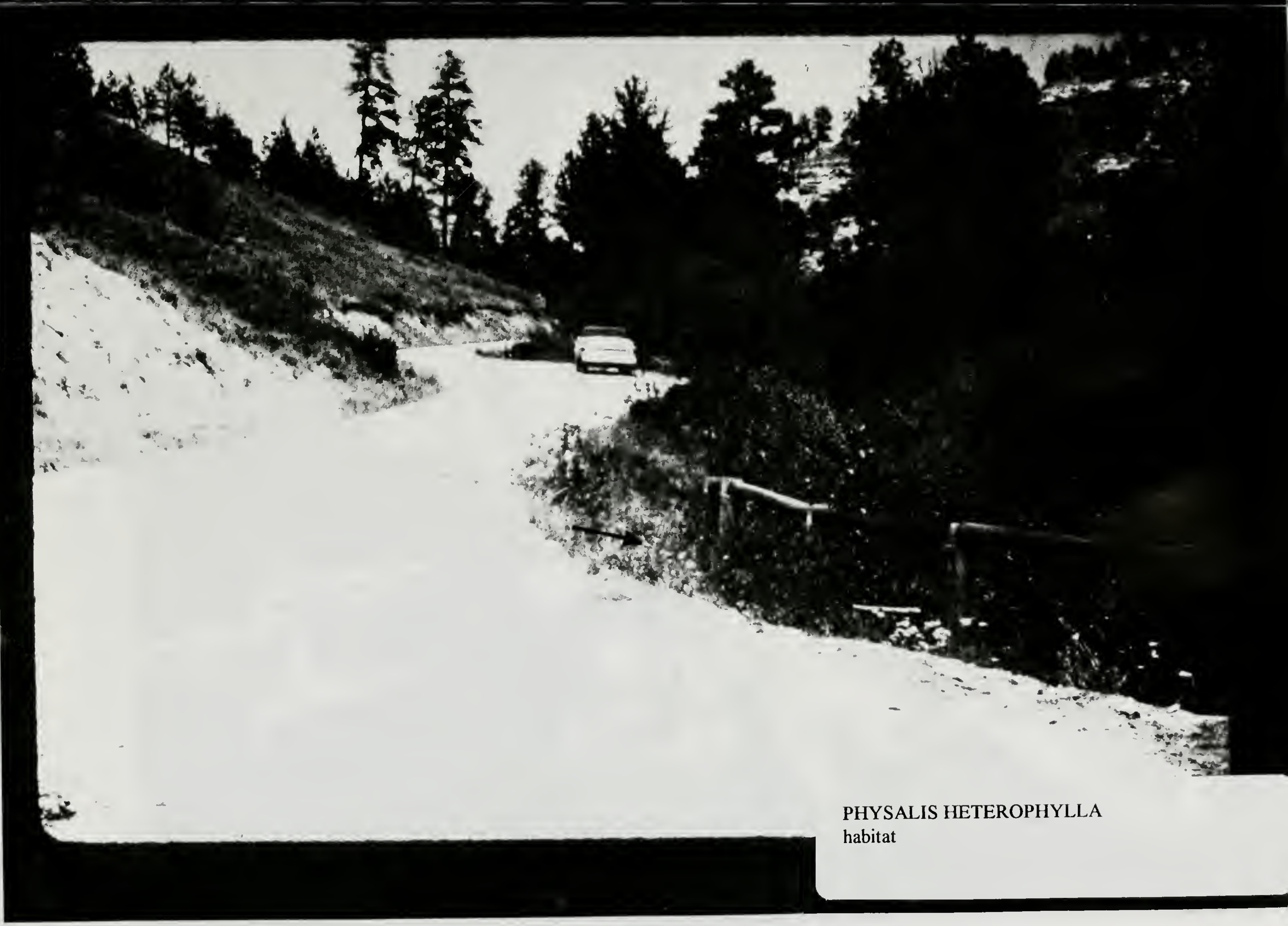
DICHANTHELIUM WILCOXIANUM
habitat

PENSTEMON ANGUSTIFOLIUS
close-up; see ASCLEPIAS STENOPHYLLA
habitat for EO#005



PHLOX ANDICOLA
close-up

PHYSALIS HETEROPHYLLA
close-up



PHYSALIS HETEROPHYLLA
habitat

PHYSARIA BRASSICOIDES
close-up

PHYSARIA BRASSICOIDES
habitat EO#002

Appendix E (SD) Close-up and habitat photographs (South Dakota)

CHAENACTIS DOUGLASII
close-up

CHAENACTIS DOUGLASII
habitat EO#003

CHENOPODIUM SUBGLABRUM
close-up

CHENOPODIUM SUBGLABRUM
habitat Medicine Rocks, MT

ERIOGONUM VISHERI
close-up

ERIOGONUM VISHERI
habitat EO#046

HAPLOPAPPUS ARMERIOIDES
close-up

HAPLOPAPPUS ARMERIOIDES
habitat Slim Buttes

HAPLOPAPPUS ARMERIOIDES
habitat   North Cave Hills

PENSTEMON NITIDUS
close-up

PENSTEMON NITIDUS
whole plant

PENSTEMON NITIDUS
habitat EO #002

Appendix F. Preliminary vascular flora of Carter County, Montana
Appendix F. Preliminary vascular flora of Harding County, South Dakota, annotated by distribution on the Sioux District -
IN PROGRESS - preliminary floristic lists will be submitted as separate attachments

Appendix G. Sioux District target species documented outside the state they are tracked - IN PROGRESS - will be submitted as a separate attachment